AN EVALUATION OF TECHNIQUES FOR THE TEACHING OF WORD RECOGNITION

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CHAPTER I

INTRODUCTION

The History of Teaching Word Recognition

Throughout the history of the teaching of reading, various methods have been championed as the most effective in the teaching of word recognition. This study is designed to discuss the development of techniques, to review the basic research data available in the area of teaching word recognition, and to present new objective evidence as based on the experimental work of this writer.

Methods of teaching word recognition date back as early as the period of Charles the Great, 800 A.D. Techniques such as the ab-eb-ib columns to teach the fundamental letters and phonics were employed during this period and up through the days of Martin Luther. The letter-picture device or the "A-B-C" books which contained the familiar "A" is for "Apple," "B" is for "Ball" material was introduced to children as early as the sixteenth century. Comenius recommended such reading aids in his popular teachings in the middle of the seventeenth century.[1]

In the United States, European techniques were embodied in most of the readers in the late seventeenth and well into the eighteenth century. In 1690, Benjamin Harris's New England Primer exemplified the "universal assumption that the knowledge of letters was the basic element in successful reading."[1] The blue-backed speller of Noah Webster dominated as a speller and a reader from 1780 until 1850. During this same period in Europe, Pestalozzi devised an extreme form of word analysis and applied it in his schools.[2]

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[1] Paul Witty and David Kopel, Reading and the Educative Process, (New York: Ginn and Co., 1939), p. 294.

It was not until about 1850 that any real concern for methods of teaching reading was shown. It was about this time that graded series of books became available; the most popular of these being the McGuffey Readers. McGuffey stated in his Eclectic Primer of 1879: "The plan of the book enables the teacher to pursue the Phonic Method, the Word Method, the Alphabet Method, or any combination of these methods."[3]

About the last decade of the nineteenth century, phonic, word, and sentence methods were advocated in many of the texts with each author claiming that his technique required only a minimum of attention to the mechanics of reading.[4] During this same period, Horace Mann urged the use of the "word method" which emphasized larger perceptual units and seemed psychologically more appropriate in revolt against the phonetic and alphabet approaches.[1] Gradually, this word method was replaced by phrase, sentence, and story approaches in an attempt to subordinate the mechanics of reading to the more important process of securing understanding.

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[1] Ibid.

[2] David H. Russell, Children Learn to Read, (Boston: Ginn and Co., 1949), p. 207.

[3] Grace M. Fernald, Remedial Techniques in Basic School Subjects, (New York: McGraw-Hill Book Co., 1943), p. 29.

[4] Witty and Kopel, op. cit., p. 295.

By 1920, there was such a reaction against the phonic approach or any method of teaching specific words that no reputable school would dare promote such techniques. "In these schools meaning was to be considered almost the only factor in word perception, and children were expected to identify new words by 'guessing' from context."[2] This revolt had a very positive effect in the development of texts as the interest content of reading series was greatly improved and consideration was given to controlled vocabularies. These trends gave way to unstructured developmental reading programs which engendered a storm of protest from parents and teachers that the children were not learning how to read. The importance of word perception or word analysis as a factor in learning to read came once again to the forefront because of public demand and the belief that many children were not learning to read from these "progressive," intrinsic methods.[3] The development of word-attack skills through the application of the phonetic, visual, structural, kinesthetic, and various combinations of these methods, remains a basic factor in teaching a child to read in most of the materials and instructions in use in the United States today.[1, 2]

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[1] Deborah C. Partridge, "The Teaching of Beginning Reading," The School Executive, LXXIII (December, 1953), p. 55.

[2] William S. Gray, On Their Own in Reading, (New York: Scott, Foresman and Co., 1948), p. 26.

[3] Anna D. Cordts, "Functional Phonetics for Power in Reading," Elementary English, XXX (February, 1953), p. 91.

In summary of the history of the teaching of reading, the methods which have been developed to teach reading in their chronological order are: the alphabetical oral method in which each word was learned by spelling orally; the phonetic method, in which the words were sounded out; the look-and-say method, in which each word was memorized by looking at it and hearing it pronounced; the phrase method, which was similar to the look-and-say method except that the unit of learning was a phrase instead of a word; and the kinesthetic method, in which the word was learned by tracing.[3] Other methods such as the non-oral and the intrinsic have been developed in the last few decades. Since such methods as these have to do with a general approach and include the specific methods of teaching word recognition, only incidental note will be given them.

Present Status of Teaching Word Recognition

The status of teaching word recognition today remains on a confused, basically subjective, level with many strong disagreements between the various reading authorities. The area in which we find much of this

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[1] *Ibid.*

[2] Russell, *op. cit.*, p. 209.

[3] Helen A. Murphy, "Skills Instruction in Primary Reading," *National Elementary Principal*, XXIX (December, 1949), p. 4.

disagreement is in the selection of an appropriate method or methods as a basic plan for the teaching of reading. There is general agreement that special attention should be given to the development of word recognition skills, but here agreement ends.[1]

The rationale for the insistence upon teaching these skills is that word recognition is the most fundamental of all the reading skills.[2] Dolch states, "Reading is getting the right words and then getting the right meaning or story. Without the right words, the story will be wrong."[3] He expresses this view again when he says:

> We may say that the understanding of words in reading is basic because without understanding of word meanings there can be no reading. Words are to reading matter what bricks are to a house. When you look at the house you do not think of the bricks; but without the bricks there would be no house.[4]

Cattell's study, as well as numerous other laboratory studies since 1885, further demonstrates the psychological rationale of the word method. Cattell found that the average adult reader could, in 10 ms. of exposure time, identify equally well three or four unrelated letters, two unrelated words (up to about twelve letters), or a short sentence of four words (or approximately twenty-four letters if in words). Since the maximum for unrelated letters was only three to four, this would indicate that the words were not perceived in terms of letters.[1] The conclusion drawn from this experiment and other similar ones is that we do not usually read by letters but by whole-word units. A letter-by-letter approach such as the "A-B-C" method would not have valid support in this conclusion. Cattell's research would tend to imply the superiority of a phrase or sentence approach to the teaching of reading. Anderson and Dearborn point out a major fallacy in using a phrase or sentence method as a basic approach:

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[1] Samuel A. Kirk, Teaching Reading to Slow-Learning Children, (New York: Houghton Mifflin Co., 1940), p. 166.

[2] Nila B. Smith, Learning to Recognize Words, (New York: Silver Burdett Co., 1947), p. 1.

[3] Edward W. Dolch, Problems in Reading, (Champaign, Illinois: The Garrard Press, 1948), p. 46.

[4] Edward W. Dolch, "The Use of Vocabulary Lists in Predicting Readability and in Developing Reading Materials," Elementary English XXVI (March, 1949), p. 142.

> It should mainly be understood that the sentence approach is not a complete method of teaching reading. Sooner or later the child must learn the individual words of the sentences or acquire a basic reading vocabulary. Otherwise he will not be able to recognize the words in new sentences or be able to read unfamiliar material.[2]

Many authorities agree that the most common cause of confusion and slow learning in beginning reading is the failure of the child to become independent in word identification skills.[3] Perhaps it would be well to clarify some of the nomenclature that will be used throughout this paper because such terms as "identification" and "recognition" seem to possess varied meanings in the field of reading. For this study, "word-identification" has to do with the attacking of the pronunciation of a word on its first encounter. In identification, it is necessary for someone to tell the child what the oral label for the visual symbol is or he has to use some device to determine what it is independently. "Recognition" takes place upon the child's second or later meeting with the word; it is the "act of knowing a word when he meets it again, after he has identified it in a previous meeting."[1] McKee helps to clarify this important difference:

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[1] James M. Cattell, "The Inertia of the Eye and Brain," Brain, VIII, cited by Irving H. Anderson and Walter F. Dearborn, The Psychology of Teaching Reading, (New York: Ronald Press Co., 1952), p. 212.

[2] Irving H. Anderson and Walter F. Dearborn, The Psychology of Teaching Reading, (New York: Ronald Press Co., 1952), p. 246.

[3] Lucile H. Latting, "A Program for Word Analysis," The Instructor, LXI (September, 1951), p. 37.

> Thus, in a very real sense, one's ability to recognize a word is a test of the thoroughness with which he has identified that word. It is important to understand also that in recognizing a given word one should be such a skillful user of the context and of the initial and the larger sound elements in the word that the degree of word analysis in which he needs to engage is much less than that which he used in identifying the word.[2]

In other terms, the act of identifying a word continues until the child has become so familiar with the word that he can recognize it "in a flash in various settings."[3]

Today the reading authorities seem to agree that there are three basic approaches to the teaching of word recognition. The visual, the phonic, and the kinesthetic are generally listed as the three main avenues or methods involved in the development of word recognition skills.[1,2,3,4,5,6,7].

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[1] Ibid., p. 115.

[2] Paul McKee, The Teaching of Reading in the Elementary School, (New York: Houghton Mifflin Co., 1948), p. 257.

[3] Ibid., p. 22.

Delwyn Schubert summarizes our present predicament in his article, "Whose Brand of Reading Methods is the 'Best Buy'?" "When the numerous methods and techniques of teaching reading to the disabled reader are pondered, many teachers are in a quandary. Each specialist - Gates, Monroe, Dolch, Fernald, etc., all renowned in the reading field - advocates a different method...."[8] This great concern for finding THE method for the teaching of word recognition is based on the assumption that "what children need is a simple and successful technique for identifying new words under their own power. Few children are able to devise a satisfactory method of their own. Pupils must be taught a technique

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[1] Edward L. French, "Kinesthetic Recognition in Retarded Readers," Educational and Psychological Measurement, XIII (1953), p. 637.

[2] Fernald, op. cit.

[3] Arthur I. Gates, "A Study of the Role of Visual Perception, Intelligence, and Certain Associative Process in Reading and Spelling," Journal of Educational Psychology, XIX (1926), pp. 433-45.

[4] Anna Gillingham and B. W. Stillman, " Training for Children with Specific Disability in Reading, Spelling, and Penmanship, (New York: Sackett and Wilhelm Lithographing Corporation, 1940).

[5] Samuel A. Kirk, "The Influence of Manual Training on the Learning of Simple Words in the Case of Subnormal Boys," Journal of Educational Psychology, XXIV (October, 1933), pp. 525-35.

[6] Marion Monroe, Children Who Cannot Read, (Chicago: University of Chicago Press, 1932).

[7] Raymond M. Mosher and Sidney M. Newhall, "Phonic Versus Look-and-Say Training in Beginning Reading," Journal of Educational Psychology, XXI (October, 1930), pp. 500-06.

[8] Delwyn G. Schubert, "Whose Brand of Reading Methods is the 'Best Buy'?" Clearing House, XXVII (January, 1953), p. 266.

that will function when they need it and without interrupting their reading."[1] To this end, the various reading specialists have developed methods centering about major emphasis on one or more of the three basic approaches, with each claiming that his particular brand is best.

In order to obtain a clearer picture of these three basic methods in relation to their respective proponents, their rationale, and the advantages and disadvantages of each, the visual, the phonic, and the kinesthetic methods are briefly outlined.

The Visual Method

The visual method, as the name implies, relies almost exclusively on the eye as the receptor and the means of interpreting the printed symbol stimulus. Most proponents of this method use some or all of the following procedures in developing word recognition skills:

1. The use of general characteristics of the words. As the child has repeated associations with a word and "as it becomes more readily recognized at sight, the general shape suffices to cause its recognition."[2] In this attack, the child relies heavily on such word-form clues as the length of the word (to, as contrasted with grandfather), and "the general appearance of the word (there, see, have, little)."[3] It is a "rough form of perception which may not apply to certain words. For example, man and was

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[1] Anna D. Cordts, "As Easy as Pie," The Grade Teacher, (June, 1954), p. 6.

[2] Guy L. Bond and Eva Bond, Teaching the Child to Read. (New York: The Macmillan Company, 1943), p. 151.

[3] Ibid.

may look much alike in general shape (configuration). On the other hand, it is a good visual cue where words have a special shape such as apple...."[1]

2. The use of striking characteristics of words. "At first, the pupils recognize the words on the basis of general configuration and the more obvious component features."[2] But this does not carry them very far in independent reading. Gradually, the children must learn to observe more details, more subtle features, the peculiar or striking characteristics of the word.[3] "Special characteristics of a word might be the double t in butter.",[4] or the long tail y at the end of the word monkey. Anderson and Dearborn point out how children rely on this technique in beginning reading:

> What children mainly seem to have an eye for is some detail of the word, a single letter or two, which then comes to stand for the whole word; at least during the early stages of learning to read, youngsters frequently confuse words which have the same letters in them, and the inference is that individual letters continue to play an important part even when the children get the words right. The letters are not recognized as such, but merely as signs representing or distinguishing the word.[5]

3. The use of small words within larger words. "The use of small words within larger words is another useful and rapid technique for word recognition."[6] An example of an application of this attack is

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[1] Russell, op. cit., p. 207.

[2] Gray, op. cit., p. 46.

[3] Arthur I. Gates, The Improvement of Reading, (Rev. New York: The Macmillan Co., 1935), p. 450.

[4] Russell, op. cit., p. 207.

[5] Anderson and Dearborn, op. cit., p. 217.

[6] Bond and Bond, op. cit., p. 153.

the recognition of and in the words stand, land, band, grand, etc.

4. The use of large known parts within words. This technique is similar to the use of small words within larger words approach. Here the teacher calls the child's attention to similarities to known words. For example, "if the children know glass, they may make a good guess at class. The recognition of familiar parts may occur in compound words, such as fireman...."[1]

5. Use of careful visual study of the word. Gates tells of clinical experiences with reading disabilities in which this method was employed.

> ....A method which gives particular prominence to experiences in visualizing - or recalling in the 'mind's eye' - the appearance of a word as a whole and part by part....Just as attempts to recall or recite a piece of prose or verse or a series of nonsense syllables tend to give birth to better techniques of learning by rote than do mere reading and rereading without active recall, so efforts to recall the look of the word may tend to produce a more effective way of seeing words one wishes to recognize later.[2]

Bond is in basic agreement with Gates when he states:

> From time to time it is necessary for a word to be given a more exact and closer visual inspection than is indicated in any of the preceding techniques. In so doing the child gives the word a thorough inspection from left to right, starting at the beginning of the word and going completely through to the end of it.[3]

6 The use of syllabication or structural analysis. Skill in this technique must be developed out of the previously acquired skills of visual analysis of monosyllabic words. In other terms, the unit of recognition

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[1] Russell, op. cit., p. 207.

[2] Arthur I. Gates, The Improvement of Reading, op. cit., p. 161.

[3] Bond and Bond, op. cit., p. 156.

now becomes a syllable instead of the whole-word as the unit.[1]

7. The use of picture-word association techniques. Gates found this method effective in teaching reading retardates as well as deaf-mutes. With this approach, the pictorial representation of the word gives an added association to the printed symbol, thus making it easier to recall.[2]

The proponents of the visual method in teaching word recognition to beginning readers outline the rationale of this attack by the following explanation:

> To the first grade they (the children) typically bring certain abilities in auditory and visual discrimination, and it becomes the task of the primary teacher to sharpen and direct these potential reading abilities. Partly as a result of the teacher's planned guidance most high first-grade children can recognize gross similarities and differences in the appearance of objects pictures, and word forms.[3]

Identification of the words and later recognition are made possible by having the child look at the form of the word while the teacher tells him the pronunciation of the new word. "By looking at the form, supposedly as a unit, and at the same time thinking the pronunciation and consequently the meaning, he associates the pronunciation and the meaning with the form."[4] In all of this early work, the teacher does not attempt to teach the names, sounds, or forms of the letters, and the child is not encouraged to employ any word analysis skills.

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[1] Ibid., pp. 145-46.

[2] Samuel A. Kirk, Teaching Reading to Slow-Learning Children. op. cit., p. 160.

[3] Russell, op. cit., p. 207.

[4] McKee, op. cit., p. 22.

Authors who propose the visual method as the major emphasis in the teaching of word recognition skills list the following advantages in utilizing this approach:

> 1. The unit of recognition is the word, and words are more readily grasped by the direct method than by either the alphabet or phonetic methods. Of all methods, therefore, the word method constitutes the quickest way for teaching a basic sight vocabulary and for getting the process of real reading under way.[1]
>
> 2. More rapid results are generally obtained by the direct method of simply showing the word to the child and telling him what it is. What makes learning easy by this method is that the sound of the word is already familiar to the child. This is the real justification of the 'look-and-say' method. The sounds of the individual letters and of the letter names do not constitute an adequate stimulus in the same sense. Visual symbols acquire an associate force in terms of the response to the sound of the whole word.[2]
>
> 3. Every word has a distinct visual pattern produced by its length and the nature of its component letters.[3]
>
> 4. What is wanted is the habit of seeing a word as a group of familiar and simpler parts and of seeing it clearly rather than vaguely or confusedly or only a detail of it as one would first perceive a complex Chinese character. Just as the trained musician hears an orchestra as a whole and at the same time as a related group of familiar units whereas the novice hears only a confused, undefined storm of noise, so the effective reader sees the word at once as a whole of clearly perceptible parts.[4]

The proponents of the visual method, thus believe that the alphabet, phonic, and kinesthetic approaches detract from the child's attempt to see the word as a whole unit and that the visual method is the only natural method of perceiving the word. Since reading is basically a visual process, any other method employed to teach recognition is an artificial approach in their opinion.

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[1] Anderdon and Dearborn, op. cit., p. 256.

[2] Ibid., p. 213.

[3] McKee, op. cit., p. 22.

[4] Arthur I. Gages, Psychology of Reading and Spelling with Special Reference to Disability, (New York: Teachers College, Columbia University, 1922), p. 46.

5. Materials are readily available for the visual approach. It provides a broader variety of activities within the method than the others. This variety gives the child learning process.

6. Most teachers are familiar with the visual approach. This is not true of the phonic or kinesthetic approaches which would make it extremely unwise for many teachers to attempt to teach word recognition by these methods.

7. The children seem to enjoy the visual approach more as it is not so encumbered with drill-type activities as the other two basic methods.

Criticisms that have been leveled against the look-and-say or visual methods are numerous and certainly many of them are valid. Some of the main criticisms that are presently included in most of the literature on the subject are enumerated below.

1. It is difficult in the application of the visual method to keep the reading materials appropriate to the child's achievement level. "In his independent reading, the child should encounter no more than one 'new' word in one or two hundred running words."[1] If the child has no word analysis skills, then he must rely on another person to always be available to identify the new word for him.[2,3]

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[1] Emmett A. Betts, Foundations of Reading Instruction, (New York: American Book Company, 1950), p. 613.

[2] Gray, op. cit., p. 51. [3] Anderson and Dearborn, op. cit., p. 220.

> 2. Basically, the limitations of the word method stem from the fact that there is no careful analysis of the words.... Durrell describes a case which will serve to high-light the problem. The story concerns a child who had learned to read the word 'chicken' on a flash card, but who could not recognize it in a book. When asked how he was able to recognize it on the flash card, the pupil replied, 'By the smudge over in the corner.'[1]

3. The use of striking characteristics of words often results in inaccurate word perception. The obvious reason for this is that a great number of words have the same striking characteristics. "Consider the words 'motley,' 'money,' 'many,' 'market,' 'marker,' - every one of them contains either a 'wavy thing or two,' a 'hole,' a 'funny chair,' a 'tall middle,' or a 'monkey's tail.' Put to the test a child might confuse any one of these words with 'monkey.'"[2]

4. "Even at early levels, however, children who depend too largely on general contour may make serious mistakes. First-grade Susan should be led to notice that bump and jump look alike except at the beginning."[3] This use of general characteristics and configuration is often but a crutch which the child uses for a lack of any other means of identification or recognition.[4]

> 5. The word or 'look-and-say method imposes no control on the direction of viewing the word. The child is just as likely to tackle the word from the wrong end as from the right one. Misreadings such as 'went' for 'saw', 'was' for 'said,' and 'you' for 'my' serve to illustrate the problem.[4]

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[1] *Ibid.*, p. 220.

[2] *Ibid.*, p. 217.

[3] Gray, *op. cit.*, p. 47.

[4] Smith, *op. cit.*, p. 10.

[5] Anderson and Dearborn, *op. cit.*, pl 223.

6. With the visual method, many of the average or below average students cannot get enough repetition and enough definite cues to identify the basic sight words needed for beginning reading. "....Word-form reading is mainly an adult habit. Among children, only the better readers seem to make much use of the word form...."[1]

> 7. Too much dependence upon searching within a word for small known words in order to recognize the larger word may get the person into rather serious difficulty. In the case of some words it is far more helpful not to attempt to break them. For example, the child may attempt to find the small known words within the word 'together' - to-get-her - and get an entirely erroneous idea of such a sentence as 'The two boys ran down the street together.'[2]

> 8. Occasionally a child may be unable to use configuration clues effectively because of a special word-learning disability ....From the writer's experience, all children of normal or superior intelligence can be taught to recognize words, but all children cannot be taught by the same procedure.[3]

The Phonic Method

The phonic method, sometimes labeled the auditory method, the sound method, and the phonetic method, has experienced periods of great popularity and also periods of utter disrepute. The main controversy at this point seems to be: "Should phonetic training hold a place of primary or secondary importance in the teaching of reading?"[4]

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[1] Ibid., p. 214.

[2] Bond and Bond, op. cit., pp. 153-54.

[3] Betts, op. cit., p. 614.

[4] The Twenty-Fourth Yearbook of the National Society for the Study of Education. Report of the National Committee on Reading. Part I., G. M. Whipple, ed. (Bloomington, Illinois: Public School Publishing Co., 1925), p. 85.

In word analysis, there are basically two approaches--the phonetic and the structural. By structural analysis is meant the "means by which we identify part of a word that helps with the meaning or pronunciation of the whole, as the root of the word, deduct. In phonics, sounds of letters in words and sounds of continuations of letters are used in word attack.[1]

The rationale of the phonic method is similar to that of the visual method in that it begins with the abilities that the child brings to the first grade situation. With the phonic method, it is the background of auditory experiences that will have direct application in the association of the pronunciation (sound) of the word with the printed symbol representation of that word that is important in beginning reading. "The fact that the children themselves normally become sound-conscious as a result of reading and pronouncing words containing similar sound elements suggests that using the analogy between parts of words to identify new or forgotten words has a sound psychological foundation."[2] As Bond and Bond point out:

> Children are obviously able to recognize many more spoken words than printed ones. The method of phonetic analysis is designed to give the child a means of sounding out a word so that he may recognize it as a word that he knows when he hears it spoken. The use of sounding words is to relate the printed word with the child's many years experience in spoken language. Through the use of phonetic analysis the child is able to work out the pronunciation of many words that then become known to

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[1] Latting, op. cit., p. 37.

[2] Gertrude Hildreth, "Reading Programs in the Early Primary Period." National Society for the Study of Education Forty-Eighth Yearbook, Part II. Reading in the Elementary School. Chicago: The University of Chicago Press, 1949, p. 117.

> him as familiar words in his recognition vocabulary of spoken words.[1]

In order to become facile in phonetic analysis the child must know the sounds of the individual letters and groups of letters. "Through this knowledge the child is supposed to identify the sound of the elements (either single letters or phonetic groups) in the proper order, then to recombine them through blending into a complete sounding of the word. In this way he works out the pronunciation of the word. Then he recognizes the word as one familiar to him in his spoken language."[2]

Techniques involved in the presentation of material for the acquisition of phonetic analysis skills include the following as outlined by various authors of this method:

1. The development of auditory discrimination ability is usually a first step in a sound phonetic program. The child should quickly grasp the concept that cat and umbrella have very little in common but that cat and rat do possess similar sound elements.[3]

2. The child uses the sight words he already knows to learn the units in the new words he meets.

> It is from these words that he learns the units or cues and to which the reader refers if a cue has been forgotten.... From the known word cat, the children learn to pronounce the beginning ca and from run they learned the ending n. By blending ca and n they identified can, a difficult word for beginners to remember on sight.[4]

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[1] Bond and Bond, op. cit., p. 161. [2] Ibid.

[3] Fred J. Schonell, The Psychology and Teaching of Reading. (London: Oliver and Boyd, Ltd., 1945), p. 17.

[4] Anna D. Cordts, "As Easy as Pie." The Grade Teacher. (June, 1954), p. 6.

> 3. To develop the auditory acuity which is necessary for correct pronunciation, for discrimination between words of similar sound, and for correct phonetic analysis, possibilities relating to sound which are inherent in experience should be utilized. Examples of such activities are (1) Create rhymes and jingles. If they see the jingles in written form, attention should be called to the word endings of that rhyme.[1]

Dolch[2] explains some of the phases of teaching a child phonics that he considers important:

4. Letter-sound combinations which take the form of teaching the sound of the consonants and vowels rather than the names of the letters are important in the early stages of teaching phonics.

5. There are certain two-letter sound combinations that are essential for the child to learn such as "bl," "gr," "th," etc.

6. Letter-group sound combinations are also taught the child; sometimes these combinations are referred to as word-families. For example, the ight in such words as night, sight, fight, bright, and light.

7. There are rules that the child should be able to apply as he develops in his phonic skills. Rules regarding the sound of the vowels that generally apply in the English language is an example. It is important that the teacher caution the children "That there may be exceptions to the rules."[3]

It is important to note that various authors of phonics manuals and texts present quite different plans of teaching word recognition by the phonics method.[1] The above procedures, however, seem to typify the basic ones included in most outlines presented.

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[1] Roman Gans, Guiding Children's Reading Through Experiences. (New York: Bureau of Publications, Teachers College, Columbia University, 1941), p. 39.

[2] Edward W. Dolch, "How a Child Sounds Out a Word." The Elementary English Review, XXII (November, 1945), p. 279.

[3] Ibid., p. 280.

Advantages of using the phonic method as the basic approach to the teaching of word recognition as offered by its various proponents include:

1. Phonics increases independence in recognizing words previously learned. "By comparison with the word method (sight method) the phonetic method promotes accuracy in word perception and independence in word recognition."[2]

2. It aids in "unlocking" new words by furnishing the student with a method of sound analysis.

3. According to Agnew, the phonic method encourages correct pronunciation, and

4. It improves the quality of oral reading.[3]

5. The phonic method develops habits of close attention to words and word parts which may have a favorable influence on later spelling achievement.[4,5]

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[1] Samuel A. Kirk, Teaching Reading to Slow-Learning Children, op. cit., p. 165.

[2] Anderson and Dearborn, op. cit., p. 237.

[3] Donald C. Agnew, The Effect of Varied Amounts of Phonetic Training on Primary Reading, Duke University Research Studies in Education, No. 5 (Durham: Duke University Press, 1939).

[4] Russell, op. cit., p. 211.

[5] David H. Russell, "Diagnostic Study of Spelling Readiness," Journal of Educational Research, XXXVII (December, 1943), pp. 276-83.

> 6. An exhaustive study of the most frequently recurring words in the children's reading vocabularies shows that as few as 85 units or cues serve to identify more than four-fifths of all the words the children will meet in their reading in the elementary grades and in junior and senior high school.[1]

About 86 per cent of all English monosyllables are phonetic.[2] Thus a child who has gained facility in the phonetic approach could attack effectively most of the words with which he will be confronted in the primary grades.

Disadvantages of using the phonic method as the basic approach that are outlined in the literature include:

1. Formal drill in sounding isolated words may not transfer to context reading. "It may lead only to slow-word-calling, not to thinking meanings of words. In fact, under certain circumstances, sounding may actually detract from thinking word meanings."[3] An overemphasis on phonics often leads reading to "deteriorate into a merely mechanical process, devoid of meaning."[4]

2. Overemphasis on phonics tends to slow down the reading rate. "...Some pupils acquire from such instruction the habit of analyzing words in considerable detail and carry that habit into their recognition of familiar words."[5]

3. Spache points out the fact that the English language is relatively nonphonetic. The thirteen vowel sounds of our language may

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[1] Anna D. Cordts, "As Easy as Pie," op. cit., p. 6.

[2] George D. Spache, "Phonics Manual for Primary and Remedial Teachers." Elementary English Review. XVI (April, 1939), pp. 147-150.

[3] Hildreth, op. cit., p. 117. [4] Betts, op. cit., p. 615.

[5] McKee, op. cit., p. 259. pg 9

be represented in 104 ways; therefore, we are limited in the number and kinds of generalizations or rules that we can make about it. He also points out that the same groups of letters may have very different sounds as in the eight words "dough, bough, bought, cough, rough, through, thorouth, and hiccough."[1]

4. Intensive and extensive use of phonic analysis produces unenthusiastic reading. Because attention is directed to form rather than comprehension, interest is sacrificed.[2,3]

5. "Unnatural articulation is often produced by unwise phonic instruction."[4]

6. "The usual letter-type phonics instruction does not carry over to the pronunciation of polysyllabic words."[5]

7. Many teachers have had no real training in teaching phonics and thus much misteaching is found in this area.[6,7]

8. "Children need a certain degree of mental maturity (a mental age of seven years) before they can make much use of sounding for getting word meanings in context."[8]

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[1] Spache, op. cit.

[2] David H. Russell, Children Learn to Read, op.cit., p. 212.

[3] Betts, op. cit., p. 615.

[4] Ibid. [5] Ibid. [6] Ibid.

[7] Anna D. Cordts, "Functional Phonetics for Power in Reading," op. cit., p. 91.

[8] Hildreth, op. cit., p. 117.

Russell states:

> The advantages and disadvantages of the phonics methods may be summarized by saying that there is no superiority in the phonics method, when used as the sole or principal method of teaching, over other methods. However, it may have values in combination with other methods, particularly for certain pupils who seem to respond readily to auditory clues.[1]

Marion Monroe and Samuel Kirk have been two of the leading proponents of the phonic method in modern reading.[2]

The Kinesthetic Method

Compared with the visual and the phonic method, very little study has been given to the kinesthetic method. Many reading authorities feel that the kinesthetic method is not a true method and that it has little intrinsic value.[3]

The rationale of the kinesthetic approach is summarized by Anderson and Dearborn:

> The usual reasoning behind these methods (writing and tracing) is that our earliest memories of words are largely muscular in nature. By having the child write or trace the word, the kinesthetic sense is brought to bear as an aid to the recognition of the word.[4]

Fernald and Keller give an explanation of their theory of the kinesthetic factors operative in learning to read:

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[1] David H. Russell, Children Learn to Read, op. cit., p. 212.

[2] Samuel A. Kirk, Teaching Reading to Slow-Learning Children, op. cit., p. 156.

[3] Arthur I. Gates, The Improvement of Reading, op. cit., p. 366.

[4] Anderson and Dearborn, op. cit., p. 231.

> Perhaps we can go no further in theory than to say that, in the specific cases studied, lip and hand kinaesthetic elements seem to be the essential link between the visual cue and the various associations which give it word meaning. In other words, it seems to be necessary for the child to develop a certain kinaesthetic background before he can apperceive the visual sensations for which the printed words form the stimulus. Even the associations between the spoken and the printed word seem not to be fixed without the kinaesthetic link.[1]

The kinesthetic method, unlike the visual and the phonic, had a rather specific starting date and a definite structure of procedures to be followed in the teaching of word recognition by this approach. An outline of the kinesthetic method as proposed and practiced by Grace M. Fernald and Helen Keller at the University of California follows:[2,3,4]

1. In the first stage the child learns the word by tracing it. The teacher writes the word on paper in plain blackboard size script, with crayon. The child then traces the word, saying each part of the word as he traces it. His finger makes contact with the crayon at all times while he is tracing the word. He is asked to repeat this process until he is able to write the word without looking at the copy. The child then uses the word in a "story" constructed from his own experience. After the story has been completed, it is typed for the child so that he may have practice reading the word and the story in print.

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[1] Grace M. Fernald and Helen Keller, "The Effect of Kinaesthetic Factors in the Development of Word-Recognition in the Case of Non-Readers," Journal of Educational Research, IV (1921), p. 355.

[2] Grace M. Fernald, Remedial Techniques in Basic School Subjects, op. cit., Ch. I.

[3] Grace M. Fernald, "On Certain Language Disabilities," Mental Measurement Monograph, (August, 1936), pp. 8-10, as cited in Samuel A. Kirk, Teaching Reading to Slow-Learning Children, op. cit., p. 154.

[4] Grace M. Fernald and Helen Keller, "The Effect of Kinaesthetic Factors," op. cit., pp. 355-377.

2. The tracing is no longer necessary as in the first step. The child can now say the word over to himself, provided it is written for him in the same manner as outlined above. At this level, he continues to write freely and to read the typed copy of his compositions.

3. As the third phase, the child learns the printed word by saying it to himself before he writes it. The teacher does not write the word for him. The child merely glances over the words, says them once or twice, and then attempts to write them without a copy. It is at this stage the child begins to read from books. If he is confronted with unfamiliar words in his book reading, he is told these words. When he has finished reading, the new words are reviewed and written, and later checks are made to insure retention.

4. In this last stage, the child is able to recognize the new words from their similarity to words already known. Fernald finds that this last stage of generalizing is the most difficult one for many teachers to complete.

Advantages of the kinesthetic method as a basic approach to the teaching of word recognition include:

> 1. The feel of the word to the child as he traces or writes it is of great value in cementing the visual and the auditory aspects of the word into a meaningful whole. The movement or kinaesthetic impressions of words are no less important than the visual or the auditory impressions in learning to read.[1]
>
> 2. Kinesthetic learning for many pours a wealth of meaning also into what they read. What is children's 'restlessness' and

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[1] Schonell, op. cit., p. 17.

> 'squirming' in the classroom but an index of wanting to exercise, grow and learn by the pull of nerve and tendon and the push of muscle in an infinite variety of body movement that gives life and meaning in its turn to reading.[1]

3. Tracing written words and writing words aid in building up left-to-right habits of word perception essential in beginning reading.[2]

4. The kinesthetic method focuses attention upon the details of the structure of the words and is "therefore useful for pupils who tend to perceive the word as a whole rather superficially."[3]

5. The kinesthetic experience increases the number and kinds of associations made with a word.[4]

6. For many children, the "kinesthetic-tactile technique possesses the decided advantage of newness and thus avoids many of the antagonisms of a tried, but unsuccessful technique.[5] Fernald agrees with this concept; she states, "One reason we start with writing is that most of the subjects have already become so discouraged concerning reading that the mere sight of a book calls for a negative response."[6]

Critics of the Fernald kinesthetic method point out the following adverse criticisms of it as a basic method of teaching word recognition:

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[1] Malcolm S. MacLean, "A Multi-Sensory Approach to Reading," Claremont College Reading Conference 13th Yearbook, (1948), p. 108.

[2] Clarence R. Stone, Better Primary Reading, (St. Louis: Webster Publishing Co., 1936), p. 489.

[3] Arthur I. Gates, The Improvement of Reading, op. cit., p. 366.

[4] Gray, op. cit., p. 51.

[5] Russell G. Stauffer, "Certain Basic Concepts in Remedial Reading," Elementary School Journal, LI (February, 1951), p. 341.

[6] Grace M. Fernald, "Certain Points Concerning Remedial Reading as it is Taught at the University of California," Education, LXVII (March, 1947), p. 443.

1. The kinesthetic method is not a natural method of teaching reading. "It is clear that methods more natural than the kinesthetic can be used in enabling children to note details and to build vocabularies. These methods are related closely to the significant development of reading as a perceptual act in which the perusal of sequences of printed matter results in extension of understandings and organization of meanings."[1]

2. The kinesthetic method is very time consuming as contrasted with the visual and phonic methods.[2]

3. It requires much more supervision than the other methods. The kinesthetic method as outlined by Fernald is better suited to individual remedial reading work than to the teaching of word recognition to groups.[3]

4. Only a small number of classroom teachers are familiar enough with the kinesthetic approach to apply the method as a basic plan in the teaching of reading.

A Combination Method

In the research set forth in this thesis, a fourth method is given consideration. This, we have termed a "Combination Method" or an eclectic approach to the teaching of word-recognition. In the final analysis, most of the proponents of a specific teaching method conclude their discourse with a statement to the effect that in all probability, all of the methods should be used.[1] For example, Monroe, whom we generally think of in terms of popularizing a phonic approach states:

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[1] Witty and Kopel, op. cit., p. 91.

[2] Betts, op. cit., p. 688. [3] Ibid.

> The very complexity of the reading process offered the possibility of a variety of methods of learning. Reading like thought may be accomplished in many ways. Just as two individuals may think of the same object in entirely different modes of representation, so may different individuals learn to recognize a printed symbol in entirely different ways.[2]

Kirk points out that every method teaches the child the details of reading. He writes:

> Monroe and Hegge-Kirk emphasize teaching the child details in words by the use of a phonic approach to reading. Gates uses visualization of the whole words and word parts to aid the child in discriminating details. Fernald uses the tracing method which apparently gives a kinaesthetic cue to the details of the word and consequently a visual cue to word recognition and discrimination. It is probable that all authors have psychologically the same approach to the teaching of reading, although they emphasize different methods of presentation.[3]

In the combination method of teaching word recognition, the teacher shows the pupil that there are several different ways of figuring out the meaning of unfamiliar words in context: sight recognition, contextual meaning, phonetic analogy, syllabicating and sounding, structural analysis, tracing and writing the word, associating the printed symbol with pictorial representations, etc.[4]

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[1] Samuel A. Kirk, Teaching Reading to Slow-Learning Children, op. cit., p. 166.

[2] Marion Monroe, Children Who Cannot Read, op. cit., p. 111.

[3] Kirk, Teaching Reading to Slow-Learning Children, op. cit., p. 166.

[4] Hildreth, op. cit., p. 116.

Advantages cited by various authors for the combination approach include:

> 1. All the conventional methods of teaching reading have their strengths and weaknesses. The suggestion was made, therefore, that reading might best be taught by a combination of methods.[1]
>
> The truth is that no method of word analysis is fool-proof. For that reason, the child should be trained in a variety of methods of attacking unfamiliar words. Then, if one method of recognition fails, the child can drop it in favor of some other method which will succeed. The teacher's object should be to produce versatile readers who are skillful in all methods of word analysis and recognition.[2]

Gates whom we generally associate with the visual method states:

> It would seem that the conclusion is to employ a method embodying all of the suggested procedures - and techniques - tracing, writing, phonetic work of various types, visual study, and visualization directed to various features of the words. It is true ... that a good reader can utilize all the visual and auditory characteristics of words as well as context clues, and that he can use various attacks, shifting from one to another to meet particular difficulties.[3]

> 2. It would then appear possible that a specific deficiency in perception might result in a reading disability. That is, a child who has difficulty for whatever reason, in receiving or retaining visual, auditory, or kinesthetic cues, or in combining these cues to form a 'word meaning' might encounter difficulty in learning to read.[4]

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[1] Anderson and Dearborn, op. cit., p. 293.

[2] Ibid., p. 276.

[3] Arthur I. Gates, The Improvement of Reading, op. cit., p. 453.

[4] Edward L. French, "Kinesthetic Recognition in Retarded Readers," Educational and Psychological Measurement, XIII (1953), p. 637.

In teaching reading in a group situation as most reading is taught in the United States, the teacher must employ a combination of methods if the individual child is to benefit from his specific aptitudes or abilities.

3. If the child is to achieve independence in reading and to become facile in the various skills in reading, then it is essential that all methods be taught.[1,2,3,4] "No one method of teaching insures progress in all essential aspects of reading."[5]

The main disadvantage to a combination approach is in dealing with individual children who are retarded in reading. Oftentimes it is a waste of time, energy, and materials to attempt to teach word recognition by a phonic method as a part of a combination approach if the individual possesses little aptitude for instruction by this technique[6] or if he has an organic dysfunctioning.[7,8] "The most effective remedial reading program

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[1] Gray, op. cit., p. 32.

[2] Smith, op. cit., p. 11.

[3] Clarence R. Stone, Progress in Primary Reading, (St. Louis: Webster Publishing Co., 1950), p. 420.

[4] Dorothy M. Warner, "Reading Needs of the Mentally Retarded," Education, LXXI (May, 1951), p. 548.

[5] William S. Gray, "What is the Evidence Concerning Reading?", Progressive Education, XXIX (January, 1952), p. 109.

[6] Marion Monroe, Children Who Cannot Read, op. cit., p. 112.

[7] Guy L. Bond, The Auditory and Speech Characteristics of Poor Readers, (New York: Teachers College, Columbia University, 1935).

[8] Paul Fendrick, Visual Characteristics of Poor Readers, (New York: Teachers College, Columbia University, 1935).

is developed in terms of particular needs; it employs those procedures from the Fernald, the Monroe, the Dolch, the Gates, or any other method which seems to meet the special problems of individual children."[1]

In present day instruction, we find all the various methods described above in use in the classrooms throughout the United States. The selection of the method of basic approach is generally left up to the whim of the individual classroom teacher. Since there is little or no research data that would indicate the superiority of one method over another, the teacher generally relies on the following criteria in selecting a method or methods to employ: the method by which she was taught to read; the method proposed by the manual that accompanies the basal series that she uses; the method indicated by the principal or supervisor; or the method outlined by her college training instructors.

There is little continuity found from one grade teacher to the nest in the public schools in a plan for the teaching of reading; therefore, we find many cases of large gaps in the child's reading skills. For example, if the first grade teacher has been sold on the phonic method as the major emphasis and the second grade teacher attempts to steer clear of anything remotely concerned with phonics, we can readily appreciate the predicament of the child under such a system. He would have little chance for continuous development essential to becoming an independent reader in such a program.

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[1] Witty and Kopel, op. cit., p. 91.

This chapter has been concerned with a description and discussion of the various methods presently employed in the teaching of word recognition. The discussion has not been based on research but from materials gleaned from the tremendous supply of literature on the subject. For the most part, the methods have been promoted or criticized and rejected on the basis of subjective opinion, or at best, from reports of individual successes or failures. Nevertheless, either because of traditional practices or because a revered "authority" has so directed, the modern classroom teacher largely bases her choice of method or methods on the various arguments presented here. The need for objective, research studies is evident from the scarcity of such data as indicated in the following chapter to supplant the present confusion of subjective methodologies.[1]

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[1] "Reading," Encyclopedia of Educational Research, Rev. ed. (New York: The Macmillan Co., 1950), p. 995.

CHAPTER II

REVIEW OF RESEARCH

Most of the studies completed to date in efforts to determine appropriate methods of presenting material for the development of word recognition skills have dealt with the visual and phonic approaches. These studies, in general, have been far from conclusive because of the important variables not given treatment, inadequate controls, and the use of such small populations that generalizations have been limited. Moreover, these studies tell us little of the methods when conditioned by individualization of instruction as group instruction techniques have generally been employed. And also, the researchers have used general reading achievement improvement scores as the criterion of the efficacy of a particular method of teaching word recognition rather than a specific measure of the skill being studied.

The following studies which are briefly reviewed served to illustrate the above factors and to summarize most of the pertinent research that has been done in this area. It will be noted that a great proportion of these studies deal with group instruction and testing techniques, whereas this paper is concerned with a study using an individualized approach. It is believed, however, that a cursory review of these group studies will be of value in pointing out present conflicting data and in presenting further evidence for the need of such a study as attempted here. Only those studies which relate directly to our research design will be reported in detail.

Visual Method

Bowden[1] found that the beginning readers used in her experiment paid little attention to the total word form or general contour of the words. Her subjects merely recognized signs (peculiar letter shapes at beginning, medial, or ending) to aid them with their recognition in beginning reading.

Similar evidence as that found by Bowden was secured by Meek[2] who also used beginning readers as her subjects. She concluded that for her beginners certain letters or small groups of letters were the chief cues for word recognition. Through a specially designed group test, she found that the words which had the last two letters in common were more frequently confused than words in which the first two letters were the same. The test words in Meek's study were first presented together with the child's response to the actual objects. For each word taught in this manner, five other words were selected which contained letters in common with it. The confusions made between these words and the test words provided the measure for her experiment.

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[1] Josephine H. Bowden, "Learning to Read," Elementary School Journal, XII (September, 1911), pp. 21-33.

[2] Lois H. Meek, A Study of Learning and Retention in Young Children, Contribution to Education, No. 164 (New York: Teachers College, Columbia University, 1925).

Gates and Boeker[1] and Wiley[2] also found that young children recognize words more frequently by letters than by general word forms. Wiley's research revealed that confusions due to similarity of word beginnings and endings were about equally frequent, while Gates and Boeker found conflicting evidence. They concluded that confusions were most likely to occur with words with similar endings. The two studies agreed in finding that confusions of words with similar middles were infrequent. In Gates' and Boeker's study, the pre-school subjects first learned the test words through association with pictures. The responses made to these words served as the data for the experiment.

These researches indicate that children of the junior primary level do rely on visual clues to aid them in the recognition of words although they do not give any indication as to the degree for an individual or any comparative data for other methods of recognition.

Visual Method Versus Phonic Method

Tate[3], in an experiment in the Eli Whitney School in Chicago, used an experimental and control group with two divisions in the experimental group and three divisions in the control group. Division A of the experimental group consisted of the twenty-two most capable pupils; Division B consisted of the fifteen less capable students. In the control group, the three divisions consisted of the seventeen most capable in Division A; Division B consisted of the twelve who ranked medium in ability; and Division C included the seven who rated low in ability. All subjects were in the first grade. Tate allotted a special fifteen minute period in which instruction and drill in phonics only was carried on for the experimental group. In the control group, there was a ten minute session allotted each day for rapid drill in visual word recognition, phrase recognition, and exercises requiring dramatic activities but no phonics were used.

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[1] Arthur I. Gates and Eloise Boeker, "A Study of Initial Stage in Reading by Pre-School Children," Teachers College Record, XXIV (November, 1923), pp. 469-88.

[2] Will E. Wiley, "Difficult Words and the Beginner," Journal of Educational Research, XXVII (April, 1928), pp. 278-89.

[3] H. L. Tate, "Influence of Phonics on Silent Reading in Grade I," Elementary School Journal, XXVII (June, 1937), pp. 752-63.

Tate concluded the following from the above design in which he attempted to determine the influence of phonics on silent reading in the first grade. Phonics instruction and drill as judged by the results of the Gates Primary Reading Test, Type I, is far superior to the look-and-say method in developing the ability to recognize words. The results of Type 2 of the Gates Test give an indication that the look-and-say method is superior to phonics instruction and drill in developing the ability to comprehend sentences. Results obtained from Type 3 of the Gates Test show that the look-and-say method is superior to the phonic method in developing the ability to comprehend paragraphs of reading material.

The experimental and control groups in Tate's study were not equaled on the basis of intelligence quotient, mental age or other measures of ability. Another limiting factor in this research was that no pre-test of word recognition skills were employed. Tate does not give an explanation as to the different amounts of time allowed the two groups for word drill; this five minutes difference per day could account for any significant disparity found.

In the Mosher and Newhall[1] experiment, subjects were selected from three elementary schools in New Haven, Connecticut. A group type intelligence test was used to classify the subjects into three groups of superior, average, and below average pupils in every first grade classroom. In all three buildings the look-and-say method of teaching was employed in one of the first grade classes while the phonic method was used in the other room. At the end of the year, pupils were promoted to second grade rooms and the same general policy of teaching continued until the end of the second year. Measures were made of the number of eye-fixations per line, and oral and silent reading skills as an index of improvement. The authors summarize their results as follows:

> On the whole, the quite frequently made assumption that phonic training leads to substantially more accurate and independent reading appears to be negated.... 1. The measures of speed, fixation pauses, and comprehension seem to show, both individually and collectively, no essential difference in results of the two training methods compared, at least at the end of the second year. 2. Look-and-say children under the experimental conditions maintained in the schools are able to read approximately as quickly and effectively as phonic children. 3. In general our results suggest that added time devoted to phonics would not appreciably increase reading skill, and that therefore phonic training is not especially to be recommended as a device for that purpose.[2]

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[1] Raymond M. Mosher and Sidney M. Newhall, "Phonic Versus Look-and-Say Training in Beginning Reading," Journal of Educational Psychology, XXI (October, 1930), pp. 500-06.

[2] Ibid.

In the Mosher and Newhall research, teacher variance was not given consideration. Only indirect measurements of improvement in word recognition skill were used—number of eye-fixations per line, and general oral and silent reading skills. No specific measure of word recognition skills was included and all instructions and testing were of the group type.

Agnew[1] used two groups of subjects of eighty-nine children each. The groups were matched for number of years in school and intelligence. The subjects of one group were selected from a school system in which the direct teaching of phonics was deplored, while the children of the other group came from a school system in which phonics was highly regarded. All the subjects were in the third grade at the time of the experiment. Results from Agnew's work indicate that with the phonic method there was less chance for error in word recognition, but that the process is very slow and laborious. The look-and-say method is less accurate but considerably less time consuming.

Gates and Russell[2] found that a method which emphasized large amounts of phonetic drill was inferior to both a method which included no phonics at all and a method which incorporated a moderate amount of informal phonics. Best results, according to them, were to be had from the latter method. Gates and Russell used 354 pupils from the New York City schools. Group tests were used to equate the classes in relation to mental age and reading readiness level.

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[1] Donald C. Agnew, The Effect of Varied Amounts of Phonetic Training on Primary Reading, Duke University Research Studies in Education, No. 5 (Durham: Duke University Press, 1939).

[2] Arthur I. Gates and David H. Russell, "Types of Materials, Vocabulary Burden, Word Analysis, and Other Factors in Beginning Reading, I and II," Elementary School Journal, XXXIX (September, 1938) pp. 27-35. XL (October, 1938), pp. 119-28.

Neither Agnew nor Gates and Russell made an attempt in their studies to control teacher variance which could account for any of the significant differences reported in these studies.

The above studies would indicate that some phonics instruction is of benefit in developing skills in reading but that the look-and-say method seems to be of more importance to general reading efficiency.

Phonic Method

Tate, Herbert, and Zeman[1] performed an experiment at the Whitney School in Chicago to determine the effect on primary reading of the total nonuse of phonics. The experimental group was divided into three groups according to ability levels. The experimental factor in these groups was that at no time during the two year period was there ever an attempt on the part of the teacher or pupils to sound letters. The control groups were given incidental phonic treatment. The Gates Reading Tests used in pre-testing was an unsatisractory measure for post-testing because the control groups received maximum scores on the three parts of the test. The New Stanford Reading Test was substituted as the post-testing instrument. These researchers concluded that phonic drill of an informal type was a better method of teaching reading than the nonuse of phonics.

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[1] Harry L. Tate, Theresa M. Herbert, and Josephine K. Zeman, "Non-phonic Primary Reading," Elementary School Journal, XL (March, 1940), pp. 529-37.

The Tate, Herbert, and Zeman study lost much of its significance because of the different instruments employed in the pre- and post-testing situations. Teacher variance was not given consideration nor was the specific skill of word recognition measured by them.

Buswell[1] followed the various kinds of progress made by two equated groups of pupils for a year. One group was taught by an elaborate phonic method which stressed word recognition, and the other group by a method which emphasized a "thoughtful reading attitude and meaningful experience." The first group excelled in the ability to pronounce all the words and to follow the lines. The second group was less competent in wore recognition but were vitally concerned with the content of the materials. Buswell concluded that both methods made distinct contributions to reading growth and he pointed out that students must become proficient in all aspects of reading.

Sexton and Herron[2] concluded from their study that the teaching of phonics functions very little or not at all during the first five months of reading instruction, that phonics instruction begins to be of some small value during the latter part of the first grade, and that it is of much value in the second grade.

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[1] Guy T. Buswell, Fundamental Reading Habits: A Study of Their Development, Supplementary Educational Monographs, No. 21. (Chicago: University of Chicago Press, 1922), pp. 63-64.

[2] Elmer K. Sexton and John S. Herron, "The Newark Phonics Experiment," Elementary School Journal, XXVIII (May, 1928), pp. 690-701.

Dolch and Bloomster[1] tested the hypothesis that the ability to learn and use principles of phonics is closely connected with the increase in mental age. Through group testing techniques, they measured the subjects' mental development and their phonic attainment. The latter was tested by a specially designed multiple choice instrument. First and second graders were used as subjects. They concluded that children with mental ages below seven years cannot be expected to profit from formal phonics instructions. They also concluded that some individuals of high mental age fail to acquire phonic ability but children of low mental age are certain to fail.

Bond's[2] study indicated that pupils who have hearing deficiencies do not profit greatly from a method that stresses the sounds of words. Fendrick[3] found that pupils who have visual deficiencies do not do well when methods are used which rely on visual discrimination as the main approach to word recognition.

Hawk[4] concluded from her studies that there are factors in reading perception on the auditory and visual sides which need constant study if remedial reading is to be effective. Results on a visio-verbal or an audito-verbal test revealed difficulties in her cases which were not present in tests for pure tone, or for eye pathology.[1] Koehler[2] agreed with this in finding occasional individuals in clinical situations who appeared to be lacking in auditory acuity although ear tests showed that their hearing was normal. He feels that they were suffering from poor auditory memory and lack of discrimination of language. Traxler and Townsend[3] summarize these researches by stating: "Visual presentation of reading materials may advantageously be supplemented with auditory presentation particularly for certain pupils who learn more readily from auditory than from visual stimuli."

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[1] Edward W. Dolch and Maurine Bloomster, "Phonic Readiness," Elementary School Journal, XXVIII (November, 1937), pp. 201-05.

[2] Guy L. Bond, The Auditory and Speech Characteristics of Poor Readers, (New York: Teachers College, Columbia University, 1935).

[3] Paul Fendrick, Visual Characteristics of Poor Readers, (New York: Teachers College, Columbia University, 1935).

[4] Ara A. Hawk, "Audito-Visual Perception and Reading Success," Claremont College Reading Conference Twelfth Yearbook, (Claremont, California: Claremont College Curriculum Laboratory, 1947), pp. 135-40.

Using eight measures of auditory characteristics and their relationships to five reading measures, Reynolds[4] concluded from his work with fourth grade students that such auditory measures do not add significantly to mental age in the prediction of general reading ability.

The research reported above on the phonic method seems to indicate that phonics instruction is more beneficial to certain individuals to others. Such factors as intelligence, visual and auditory acuity, and chronological age seem of significance in determining the appropriate method of teaching word recognition. Even though the above reported studies have largely dealt with group instruction and testing procedures, their results indicate the presence of factors of individual differences other than the particular method per se.

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[1] Individualization of Instruction in Reading. Prepared by Division of Instructional Research. Education Research Bulletin, No. 1 (New York: Board of Education, New York City, September, 1941), p. 6.

[2] Warren B. Koehler, "Word-Deaf Children," Elementary School Journal, XLIII (January, 1943), pp. 273-81.

[3] Arthur E. Traxler and Agatha Townsend, Another Five Years of Research in Reading, Education Records Bulletin No. 46 (New York: Educational Records Bureau, October, 1946), p. 49.

[4] Maynard C. Reynolds, "A Study of the Relationship Between Auditory Characteristics and Specific Silent Reading Abilities," Journal of Educational Research, XLVI (February, 1953), pp. 439-49.

Kinesthetic Method

Most of the literature available for the kinesthetic approach takes the form of individual case studies. Loudon and Arthur[1] report such a typical case study application of the Fernald method. Their subject was a sixth grade boy of normal intelligence and adequate emotional adjustment whose reading was at third grade level. During a four month training period using the kinesthetic approach, this individual made outstanding progress in terms of reading achievement.

Forster[2] concluded in her study with forty subjects that success in learning to read by tracing is not due to reinforcements of kinesthetic clues but it was her opinion that the progress was due to better visual perception of the printed symbols, although she did not test this hypothesis.

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[1] Blanche Loudon and Grace Arthur, "An Application of the Fernald Method to an Extreme Case of Reading Disability," Elementary School Journal, XL (April, 1940), pp. 599-606.

[2] Miriam Forster, "Visual and Visual-Kinesthetic Learning in Reading Nonsense Syllables," Journal of Educational Psychology, XXXII (September, 1941), pp. 452-8.

Kirk's[1] experiment using six subnormals in a comparative study of the relative efficacy of the kinesthetic method versus the conventional sight method is the only experiment of this type reported in the literature that attempts to use a research methodology rather than a case-study approach. Because Kirk uses a method of selecting test items and testing procedures that is much like that used by this writer, his experiment is reviewed below in detail.

The materials for Kirk's experiment were 150 commonly known three letter words which were printed in common script on four by six inch cards.

The method of equating the list of words for his experiment was as follows. The words were printed in script on separate cards, shuffled, and a list of five words was drawn from the pack of cards each day to exclude, as much as possible, the chance factor of having more difficult words in one list than in another. Thirty lists of five words each were drawn from the cards during the experiment. Fifteen of these served as lists for method "A" and fifteen for method "B".

Method "A" was the conventional sight method, and method "B" was the kinesthetic. The words were presented in mixed order by shuffling the five cards before each test series and before each presentation. Twenty-four hours later, the subject relearned the list of five words by the same method. The recall and the relearning trials were recorded as the measures of retention. Method "A" and method "B" were used on the same subjects on alternate days.

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[1] Samuel A. Kirk, "The Influence of Manual Tracing on the Learning of Simple Words in the Case of Subnormal Boys," op. cit.

For the look-and-say method, method "A", the word was exposed for seven seconds. The subject looked at the word, heard it, and repeated it once. This procedure was carried through with all five words. Then he was tested on all five until he had one perfect repetition of the series. The number of presentations for learning was recorded as the measure of learning.

The "B" method involved the same procedures as the "A" method with a fourth factor of tracing the word with a dull pencil added.

The results of Kirk's study showed that every subject, without exception, retained a greater number of words when the manual tracing method was used, although the differences were not significant for most of the subjects. There was great variability among the subjects in terms of the number of trails to learn. In his discussion of the results, Kirk states:

> Although it has been demonstrated that teaching reading with the added factor is superior to the conventional sight method, for our subnormal subjects, in terms of retention, further research must be conducted to determine whether this conclusion is applicable to all subnormal children, to normal children, or whether the subnormal and normal differ in these respects.[1]

Kirk does not report in this study the number of teachers used in the experiment; therefore, no conclusions can be made about teacher variance. Another disturbing procedure in the above reported research is the "fourth" added factor to method "B". Method "A" employs but three activities. The question arises as to the importance of an added factor, regardless of what that factor might be. For example, had Kirk equated the two methods by the addition of presenting a pictorial representation of the words for the look-and-say method "A", there would have been four activities for each method with the possibility of very different conclusions. Actually, here Kirk has tested out a look-and-say method with a combination visual-kinesthetic approach.

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[1] Ibid.

Other related studies employing the kinesthetic approach include Castner's[1] work which demonstrated that a specific weakness in drawing tests was characteristic of twelve out of thirteen children who later experienced difficulty in learning to read.

Spelling and handwriting disabilities, which involve a more obvious kinesthetic factor than reading, show a high correlation with reading disabilities according to Lichtenstein.[2]

French's[3] study indicates that children with retardation in oral reading not attributable to known extrinsic or intrinsic causes are significantly inferior in kinesthetic recognition to children who are not retarded in oral reading.

Monroe[4] observed that many of the poor readers in her study showed a marked lack of motor control and precision which occurred with and without histories of neurological illness or pathological findings in the physical examination.

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[1] B. M. Castner, "Prediction of Reading Disability Prior to First Grade Entrance," American Journal of Orthopsychiatry, V (1935), pp. 375-87.

[2] A. Lichtenstein, "An Investigation of Reading Retardation," Journal of Genetic Psychology, LII (1938), pp. 407-23.

[3] Edward L. French, "Kinesthetic Recognition in Retarded Readers," Educational and Psychological Measurement, XIII (April, 1953), pp. 636-54.

[4] Marion Monroe, Children Who Cannot Read, op. cit.

The above reported research would seem to indicate that kinesthetic training is of benefit to some children in increasing work recognition skills. The research is too limited in this area to warrant further conclusions.

Summary of Research

It will be noted that no research was reported for a combination method. To date, there have been no studies in which more than two methods have been included in the research designs; thus, we are severely limited in drawing conclusions about the relative merits of the various proposed methods. In the studies that have been reviewed above, there is no conclusive evidence that can be used in planning a remedial or developmental program for the individual student. These studies do tend to point out the presence of individual differences in terms of appropriate instructional procedures for developing word recognition skills, but because of the various limitations of the research designs outlined earlier in this chapter, even this conclusion seems questionable.

William S. Gray summarizes the recent research as outlined above. He states:

> During the last three decades scores of investigators have sought to find out which of various methods of teaching reading is the most effective; for example, a sentence, a story or experience method, a look-and-say method, a phonic method, and so on indefinitely.... When the results of all such studies are compared, two conclusions stand out impressively. The first is that no one method secures uniformly high or poor results.... The second conclusion is that there are many factors other than the specific methods used which influence achievement, such as the insight, interest, and skill of the teacher.[1]

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[1] William S. Gray, "What is the Evidence Concerning Reading?", Progressive Education, XXIX 9January, 1952), p. 109.

In pointing out the need for continuing our efforts in determining appropriate methods of teaching word recognition, Reynolds states:

> Research has not succeeded fully, however, in specifying the particular characteristics of pupils which need to be considered in arranging the reading program. Many varieties of materials and teaching methods are available to the versatile teacher, but in making a choice among them for a particular child the teacher is left with incomplete guidance. Thus, there is continuing need for research which will specify the relationships between pupil characteristics and the various procedures for developing reading skills.[1]

It is the belief of this writer that much of the difficulty in determining appropriate methods for the teaching of word recognition comes from confounding the particular reading skill of word recognition with general reading achievement which involves not only word recognition but comprehension, generalizing, inferring meanings, etc. After all, phonics, the visual analysis of words, and kinesthetic tracings have been developed and used for the specific purpose of aiding the child in the identification and recognition of the printed symbol. It is only after the child has a certain degree of competency in word recognition skills that he is able to read. That is to say, the act of reading is different from the act of identifying a word. As Dolch[2] might state it, the child has to have a certain number of "bricks" available before the "house" can take shape. It is the problem of helping the child secure these "bricks" (words) that has been of concern; yet most of the researchers have used complicated measures of eye-fixations, sentence and paragraph comprehension tests, and speed of reading in an attempt to ascertain the relative efficiency of a particular method of teaching word recognition.

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[1] Reynolds, op. cit., p. 439.

[2] Edward W. Dolch, "The Use of Vocabulary Lists in Predicting Readability and in Developing Reading Materials," op. cit.

One reason for the utilization of such measures has been the fact that there have been no standardized instruments available to procure valid pre- and post-measurements of the specific skill being studied. Because of the lack of such an instrument, The Learning Methods Test[1] discussed in Chapter III was developed.

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[1] Robert E. Mills, The Learning Methods Test, (Gainesville, Florida: Reading Laboratory and Clinic, University of Florida, 1954).

CHAPTER III

THE DEVELOPMENT AND USE OF THE LEARNING METHODS TEST

Purpose of The Learning Methods Test

The purpose of The Learning Methods Test is to aid the remedial reading teacher in determining the student's ability to learn new words under different teaching procedures. Basically it is a series of teaching lessons with testing to determine immediate and delayed learning and the appropriateness of the various methods for different individuals.

In a recent article, Harris and Roswell[1] suggest such a series of procedures in an informal way. Murphy[2] and Sullivan[3] have also employed such a device but without the use of standardized procedures. Here we have tried to standardize the testing and the teaching steps in order that direct comparisons may be made with some degree of reliability. From the application of The Learning Methods Test, the teacher should be able to answer such questions as:

1. How many words can the child learn in a fifteen minute lesson?

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[1] Albert J. Harris and Florence G. Roswell, "Clinical Diagnosis of Reading Disability," Journal of Psychology, XXVI (1953), pp. 323-40.

[2] Helen A. Murphy, "Skills Instruction in Primary Reading," National Elementary Principal, XXIX (December, 1949), pp. 4-10.

[3] Helen B. Sullivan, "The Development of Word Recognition," Abstracted by John T. McDermott, Report of the Seventh Annual Conference of Reading, (Pittsburgh: University of Pittsburgh Press, 1951), p. 100.

2, How well does the child retain these words?

3. By what method does the child apparently learn most easily?

4. Does the child retain those learned by any one method more easily than those learned by other methods?

Need for the Instrument

The need for such an instrument as The Learning Methods Test has become urgent if the reading teacher hopes to make effective the time and effort expended in the individualized teaching of reading—either remedial or developmental. The following quotation reviewing recent research in this area points out this need:

> One fact that stands out clearly is that a given method does not always secure equally satisfactory results....A conclusion justified by experiments is that certain methods are more effective with given types of pupils than with others....Because of the complexity of the problem, the need is as urgent today as formerly for analytical studies and experiments which aim to determine the method, or combination of methods, most effective in teaching various types of pupils to read and the conditions under which each secures most rapid progress.[1]

In the past, teachers and clinicians have had to rely on a hit-or-miss procedure in finding the best method for the individual student. One approach would be tried out over a period of weeks or months, then if the student did not make expected progress or became antagonistic, that approach would be rejected and a different avenue attempted. Schubert states, "Since it is not possible to tell which method will work best in an individual case, the teacher must be flexible and versatile."[1] The Learning Methods Test is an attempt to make possible such a diagnosis with a minimum of time, materials, and effort and without harm to the subject.

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[1] Walter S. Monroe, (ed.), Encyclopedia of Educational Research, Rev. ed. (New York: The Macmillan Co., 1950), p. 995.

There is also a need for a standardized instrument such as The Learning Methods Test to carry on needed research in determining individual and group differences in this area in a more scientific manner than heretofore has been available. The development of this instrument was essential to test the hypotheses of the experiment discussed in Chapter IV.

The Methods

The four learning (or teaching) methods used in The Learning Methods Test are:

1. The Visual Method. The child is taught recognition of words by stressing exclusively the visual appearance and other visual clues and associations of the words.

2. The Phonic or Auditory Method. Word recognition is taught the student by the sound qualities of the words.

3. The Kinesthetic or Tracing Method. The student learns to recognize words by tracing, writing, and other kinesthetic procedures as outlined by Fernald.[2]

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[1] Delwyn G. Schubert, "Whose Brand of Reading Methods is the 'Best Buy'?", Clearing House, XXVII (January, 1953), pp. 266-67.

[2] Grace M. Fernald, Remedial Techniques in Basic School Subjects, op. cit.

4. The Combination Method. The above three methods are combined for the fourth procedure. Word recognition is taught the student by giving equal stress to the visual, auditory, and kinesthetic approaches.

Test Materials

1. Learning Methods Picture Word Cards. Four sets of picture word cards have been devised for use with this instrument; the sets include primer, first, second, and third grade level words. The cards are four by six inches and are designed in the manner of Dolch's Picture Word Cards[1] except that a colored card is used in order to prevent transparency.

The words chosen for each grade level were selected from The Author's Word List for the Primary Grades.[2] This list was drawn from a compilation of frequencies of word use in 84 pre-primers, 69 primers, 84 first readers, 85 second readers, and 47 third readers in use in 104 representative school systems. Only the nouns that could be pictorially represented and possessed the more common sound qualities were included in the selection. There were 46 word cards for the primer level, 120 cards for the first grade level, 114 for the second grade level, and 130 picture word cards for the third grade level.

The use of frequency of occurrence as a measure of the relative difficulty and the importance of words is discussed by Gates in A Reading

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[1] Edward W. Dolch, Picture Word Cards, (Champaign, Illinois: The Garrard Press, 1941).

[2] L. L. Krantz, The Author's Word List for the Primary Grades, (Minneapolis: Curriculum Research Co., 1945).

Vocabulary for the Primary Grades,[1] and in The Twenty-Fourth Yearbook of the National Society for the Study of Education.[2] The words selected for The Learning Methods Test and their respective placements are listed in Appendix I.

2. Test Record Forms. A test record form is necessary to record the forty words selected for the four methods, to record pertinent data about the subject, to record the results of the immediate recall test after each fifteen minute lesson, and to record the results of the delayed recall tests. A copy of a sample completed record form is in Appendix II.

Test Administration

1. Selecting Test Items (Pre-test) - General Directions. The following is an outline from the Manual of Directions of The Learning Methods Test that was followed in obtaining the reliability coefficients reported in this chapter and the data for the research design reported in Chapter IV.

In order to determine the appropriate level of words to use for The Learning Methods Test, a pre-test of word recognition was necessary. The Learning Methods Picture Word Cards were administered to obtain the forty unknown words that were to be used later in the four learning methods situations.

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[1] Arthur I. Gates, A Reading Vocabulary for the Primary Grades, Rev. ed. (New York: Bureau of Publications, Teachers College, Columbia University, 1935), p. 289.

[2] The Twenty-fourth Yearbook of the National Society for the Study of Education, Part I. Report of the National Committee on Reading, (Bloomington, Illinois: Public School Publishing Co., 1925), p. 77.

When dealing with a beginning reader, forty word cards from the primer level were selected which the child did not know. In order to obtain words of approximate equal difficulty, words from ONLY ONE level were used. That is, if forty words from the primer level could not be found that the child did not know, then no words from this level were used. Instead, a check was made to find forty unknown words on the first grade level or the next higher one.

The cards were first presented to the child word-side up. If, at the end of approximately five seconds, the child had not responded correctly to the word, it was told to him. This "unknown" word then became one of the training and test words and was placed on a pile separate from the "known" word cards. This process was continued until all the cards on that particular level had been administered. The total number of words that the child did NOT recognize was then recorded on the test record form.

From the unknown words, forty cards were selected at random. This was done by shuffling the stack thoroughly and then counting off the first forty cards. These forty cards were then recorded on the test record form in the spaces provided. The words were arranged on the record form into four sets of ten words each. This completed the pre-test.

The above pre-test generally took from five to ten minutes; the time varied with the age, intelligence, reading, level, the degree of rapport established, etc.

2. The Learning Methods Training and Testing Procedures. On the test record form there were spaces provided for recording the teaching method used for each set of words. For the reliability study and the research described in this thesis, a systematic rotation procedure was used for the order of presentation of the methods. If the "Visual" method were used on the first subject as the first teaching procedure; then the second subject was presented with the "Phonic" method as the first procedure and the "Visual" method became the fourth procedure for this subject; the third subject had the "Kinesthetic" as the first method; the fourth subject had the "Combination" method as the first method; then starting over again, the fifth subject had the "Visual" as the first method, etc.

The pre-test and Set I learning method were administered the first day. Total time for the two was approximately twenty minutes with the latter always being constant at fifteen minutes.

The delayed recall test for Set I and the administration of the learning methods for Set II were administered the second session. The delayed recall test was administered for the previous set before any of the word cards for the new set were exposed. (See below for the specific directions used in administering the delayed recall test.) This second session was scheduled for twenty-four hours after the time of the administration of Set I; all sessions were scheduled at twenty-four hour intervals.

The delayed recall test for Set II and the learning methods lesson for Set III were administered the third session.

The delayed recall test for Set III and the learning methods lesson for Set IV were given the fourth session.

It was necessary to see the child for a fifth day for a few minutes to administer the delayed recall test for Set IV. This completed the series of lessons and tests.

At the beginning of each fifteen minute training session, except the first, a delayed recall test was administered. This was simply a check of the child's recognition of the ten words taught the preceding session.

The delayed recall testing procedures involved the following steps. Using the same ten word cards used the last session as training material, the word-side of the card was exposed to the child. If he recognized the word within the five seconds of exposure, the response was recorded as correct (+) on the test record form. If he did not remember the word, a (0) was placed by the word in the "Delayed" column on the record form. The total number of correct responses was then recorded.

Validity

The Learning Methods Test is actually a measure of a subject's proficiency in the task of learning to recognize words under various teaching procedures. Since this is the ultimate criterion for which the test is designed, the instrument possesses what is termed "content" or "work-sample" validity.[1] The only type of validity study of any significance that could be made with The Learning Methods Test would be a longitudinal validation study[1] consisting of clinical case studies over long periods of time. A few such cases have been completed but the number of such studies is too small to be of statistical significance or to warrant generalizations. Authorities in test construction generally agree that content validity, as is inherent in The Learning Methods Test, is an acceptable form of validity.[2]

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[1] Technical Recommendations for Psychological Tests and Diagnostic Techniques, (Washington, D. C.: American Psychological Association, Volume 51, Part 2, March, 1954), p. 14.

The test items, i.e., the picture word cards, were drawn from frequency studies of word use from 104 representative school systems throughout the United States.[3] It would therefore seem that the test items have been selected from as valid a sampling universe as needed for the purposes of this test.

The usability of the test in clinical situations, another test of validity,[4] has been successfully demonstrated in more than one hundred clinics and school centers throughout the United States.

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[1] Donald E. Super, Appraising Vocational Fitness by Means of Psychological Tests, (New York: Harper, 1949), p. 45.

[2] Technical Recommendations for Psychological Tests and Diagnostic Techniques, op. cit.

[3] L. L. Krantz, op. cit.

[4] Technical Recommendations for Psychological Tests and Diagnostic Techniques, op. cit.

Reliability

To determine the reliability of The Learning Methods Test, thirty subjects were retested using the "equivalence of forms" technique.[1] Items for the equivalent form were selected on the same basis as the initial forty items in the process described earlier. All items were from the same grade level of difficulty.

The interval of time between test and retest ranged from one to twenty-five weeks with a mean interval of 13.4 weeks and a median interval of 13.5 weeks. The intelligence quotients for these thirty subjects as measured by the Wechsler Intelligence Scale for Children ranged from 64 to 115. The mean intelligence quotient was 90.1; the median was 90.5. All subjects were drawn from the public schools of Pasco County, located in central Florida.

Reliability coefficients were obtained on all four methods by correlating the number of right responses (words learned) for a particular method on Form A of The Learning Methods Test with the number of right responses for the same method on Form B. The reliability coefficients reported below in Table 1 were obtained by using the product-moment coefficient of correlation formula:[2,3]

$$r = \frac{\Sigma xy}{N\sigma_x\sigma_y}$$

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[1] Ibid., p. 31.

[2] Quinn McNemar, Psychological Statistics, (New York: John Wiley & Sons, Inc., 1949), pp. 92, 96.

[3] J. P. Guilford, Psychometric Methods, (New York: McGraw Hill, 1954), pp. 378-89.

TABLE 1

RELIABILITY COEFFICIENTS

Learning Methods	Coefficient of Correlation
Visual	.969
Phonic	.970
Kinesthetic	.908
Combination	.954

From the foregoing, it would appear that The Learning Methods Test is highly reliable. It should be noted, however, that no inter-examiner reliability study was made. This writer administered all the tests, teaching procedures, and retests in the reliability study reported above.

All raw scores and other pertinent data of this study are reported in Appendix IV.

Significance of Scores

After The Learning Methods Test was administered, the subject then had four "delayed" recall scores, one for each teaching method. (No treatment was given the "immediate" recall scores). If all methods had been equally effective in teaching the subject to recognize words, then all the scores would have been the same. In actual practice, of course, there were variations in the four scores. In order to interpret these variations, some measure of "significant differences" had to be derived. The following procedure was used to obtain these "significant differences" between an individual's four scores.

The Learning Methods Test was administered to the seventy-five subjects briefly described in Table 2 below. (For more complete data on these subjects, see Appendix IV).

TABLE 2

DESCRIPTION OF SUBJECTS FOR THE "SIGNIFICANT DIFFERENCES" STUDY

No. of Subjects	Chronological Age	Intelligence Range (I.Q.)
1	12	68
1	11	67
8	10	70- 94
28	9	64-115
17	8	68-128
20	7	65-115

Each subject's mean score was obtained by totaling his four scores (the number of words recalled twenty-four hours after each teaching session) and then dividing by four. For each individual, four deviation scores were then obtained. In other words, his mean score was subtracted from each of his four test scores. For the seventy-five subjects, this gave a total of 300 such deviation scores. It is important to emphasize that these deviation scores were in terms of deviations from each subject's own mean score. No population mean was used.

A frequency distribution was made of these 300 deviation scores and the mean deviation score was obtained. These deviation scores ranged from $+$ 4.0 to -4.8 with a mean of 0. The frequency distribution of these deviation scores is shown in Table 3.

TABLE 3

DEVIATION SCORES: DEVIATIONS OF SUBJECT'S FOUR DELAYED RESPONSE SCORES FROM HIS OWN MEAN SCORE

Deviation Scores - x -	Frequency - f -	- fx -	- fx^2 -
+ 4.0	1	+ 4.0	16.00
+ 3.8	1	+ 3.8	14.44
+ 3.5	0		
+ 3.2	2	+ 6.4	20.48
+ 3.0	6	+18.0	54.00
+ 2.8	5	+14.0	39.20
+ 2.5	2	+ 5.0	12.50
+ 2.2	7	+15.4	33.88
+ 2.0	10	+20.4	40.00
+ 1.8	10	+18.0	32.40
+ 1.5	9	+13.5	20.25
+ 1.2	9	+10.8	12.96
+ 1.0	18	+18.0	18.00
+ .8	16	+12.8	10.24
+ .5	8	+ 4.0	2.00
+ .2	35	+ 7.0	1.40
0	28		
- .2	22	- 4.4	.88
- .5	11	- 5.5	2.75
- .8	18	- 14.4	11.52
- 1.0	20	- 20.0	20.00
- 1.2	11	- 13.2	15.84
- 1.5	8	- 12.0	18.00
- 1.8	10	- 18.0	32.40
- 2.0	12	- 24.0	48.00
- 2.2	8	- 17.6	38.72
- 2.5	2	- 5.0	12.50
- 2.8	1	- 2.8	7.84
- 3.0	4	- 12.0	36.00
- 3.2	3	- 9.6	30.72
- 3.5	0		
- 3.8	1	- 3.8	14.44
- 4.0	1	- 4.0	16.00
- 4.2	0		
- 4.5	0		
- 4.8	1	- 4.8	23.04
TOTALS	300	- .4	656.40

$$M = \frac{170.7 - 171.1}{300}$$

$$M = \frac{-.4}{300}$$

$$M = 0$$

Since the mean of the deviation scores was 0, it became a simple matter to compute the standard deviation of these scores using the basic formula:[1]

$$\sigma = \sqrt{\frac{\Sigma x^2}{N}}$$

$$\sigma = \sqrt{\frac{656.40}{300}}$$

$$\sigma = 1.48$$

For ease in interpretation, we can conclude that if one or more of a subject's scores deviates in either direction by more than 1.5 from his own mean, this is a greater deviation than we would find in approximately 68 per cent of the cases and would probably be of clinical significance even though it is not statistically significant. If one or more of an individual's scores deviates as much as 3.0 from his own mean, this is a greater deviation than occurs in approximately 95 per cent of the cases and would be of statistical as well as clinical significance.

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[1] Henry E. Garrett, Statistics in Psychology and Education, 4th ed. (New York: Longmans, Green and Co., Inc., 1953), p. 51.

CHAPTER IV

THE RESEARCH DESIGN

Statement of Problem

This study was designed as an attempt to determine the teaching method or combination of methods most effective in teaching word recognition to various types of individuals. The four teaching methods were the visual (look-and-say), the phonic (auditory), the kinesthetic (tracing), and a combination of the three. Complete descriptions of these four methods are included in Chapter I and in Appendix III. The specific hypotheses stated below serve as an outline of the main purposes of this study.

Hypotheses

1. Chronological age, intelligence, and method of teaching word recognition interact significantly in determining the number of words learned in a fifteen minute teaching session.

2. Chronological age and method of teaching word recognition interact significantly in determining the number of words learned in a fifteen minute teaching session.

3. Intelligence and method of teaching word recognition interact significantly in determining the number of words learned in a fifteen minute teaching session.

4. Chronological age is a significant variable in determining the number of words learned in a fifteen minute teaching session.

5. Intelligence is a significant variable in determining the number of words learned in a fifteen minute teaching session.

6. Teaching method is a significant variable in determining the number of words learned in a fifteen minute teaching session.

Need for the Study

The need for this study has been evident for decades in every classroom, clinic, or wherever children have been involved in the process of learning to read. Teachers and remedial reading clinicians have been well aware that some children seem to have an "aptitude" for learning to read by a phonic approach, while others in the same situation seem to benefit little from such auditory experiences. The same has been true of the visual and kinesthetic approaches. To date, research has not been able to indicate what types of children learn best by any particular method, or whether it is a singular matter of individual differences. Indeed, research has thus far been inconclusive as to the importance of any specific methodology in learning to recognize words.

The following quotation from the Encyclopedia of Educational Research serves to summarize the need for such a study as discussed in this chapter.

> Because of the complexity of the problem, the need is as urgent today as formerly for analytical studies and experiments which aim to determine the method, or combination of methods, most effective in teaching various types of pupils to read and the conditions under which each secures most rapid progress.[1]

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[1] "Reading," Encyclopedia of Educational Research, op. cit.

Description of Subjects and Pertinent Variables

In attempting such an experiment as proposed here, the problem of selecting and treating all of the pertinent variables became of prime importance. The description of subjects and the variables that were considered of significance for this study and the treatment or considerations given each are discussed below.

A total of fifty-eight subjects were used in this study. They were selected in the chronological order in which they were referred by the classroom teachers to this writer who was serving as psychological evaluator at the time. All subjects were referred on the basis of at least six months' retardation in reading. A more complete description of the subjects is outlined in the variables discussed below.

1. Chronological Age. This variable was controlled by selecting subjects within the following three classifications of chronological age--seven, eight, and nine year olds. Each of the three age levels were given separate treatment in the design of this experiment.

2. Intelligence. The Wechsler Intelligence Scale for Children[1] was administered each subject. Only subjects that fell within one of the following three ranges of intelligence quotients were used in this experiment:

Low intelligence group - 65 through 80
Average intelligence group - 85 through 100
High intelligence group - 105 through 120

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[1] David Wechsler, The Wechsler Intelligence Scale for Children, (New York: The Psychological Corporation, 1949).

It should be noted that the above classification of intelligence levels is arbitrary and does not follow the usual classifications of intelligence set up by Terman[1] or Wechsler.[2] The five point interval was allowed between each classification so as to delineate the groups more sharply. No subjects scoring above 115 on the Wechsler Test were used in this study because eight and nine year olds who scored higher than this tended to receive maximum scores on The Learning Methods Test in the pretest situation and thus could not be used as subjects.

A question arose as to the use of intelligence quotient scores as a variable for treatment in the research design instead of mental age scores. Mental age was not employed for two reasons. First of all, since the Wechsler Intelligence Scale for Children was used as the instrument for measuring the intelligence of the subjects, it was felt that Wechsler's[3] concept of the intelligence quotient should be used. For his test, the intelligence quotients were developed for each age group without using the ratio between mental age and chronological age proposed by authors of other intelligence tests, namely Binet.[4]

Secondly, we assumed from empirical data that a nine year old subject with a mental age of six years is quite different from a six year old with a mental age of six years in relation to ability to learn to read.

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[1] Lewis M. Terman and Maud Merrill, Measuring Intelligence, (New York: Houghton Mifflin Co., 1937).

[2] Wechsler, op. cit.

[3] Ibid.

[4] Terman and Merrill, op. cit.

3. Sex. A special research design employing the t-test was used to determine the significance of this variable. The subjects selected for this treatment consisted of twenty-two boys and twenty-two girls matched on the basis of chronological age and intelligence quotients. Each of the subjects was administered The Learning Methods Test. A separate t-test was run for each of the four methods to determine whether or not the delayed recall scores made by girls differed significantly from those made by boys.

Using the basic formula,[1] $t = \frac{M_D}{S_D}$, the t's reported in Table 4 were obtained.

TABLE 4

RESULTS OF t-TESTS TO DETERMINE WHETHER OR NOT SEXES SCORED SIGNIFICANTLY DIFFERENT IN THE LEARNING METHODS TEST

METHOD	t-SCORE	Mean differences between boys' and girls' scores
Visual	1.211	.682
Phonic	1.507	.909
Kinesthetic	1.204	.909
Combination	1.375	.818

The t-scores reported in Table 4 for all four methods are not significant; they are all beyond the 10 per cent level of confidence. Differences this large in the scores would occur more than 10 per cent of the time by chance alone. We can therefore infer that our observed differences between the delayed recall scores of girls and boys are not significant for any of the four methods. In view of the above findings, both boys and girls were used in the study; however, boys outnumbered the girls by thirty-nine to nineteen.

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[1] McNemar, op. cit., p. 225.

Even though the above would indicate that sex is not of statistical significance in this study, our data do indicate that in all four methods studied, there is a tendency for girls to learn to recognize words more efficiently than boys. This is indicated by the mean differences scores reported in Table 4 wherein the differences, though not statistically significant, were always in favor of the girls. These differences in the delayed recall scores are also readily evident from the total raw scores reported below in Table 5.

TABLE 5

A COMPARISON OF TOTAL RAW SCORES BETWEEN GIRLS AND BOYS ON THE LEARNING METHODS TEST

Method		Girls	Boys
Visual		170	155
Phonic		154	134
Kinesthetic		147	121
Combination		168	150
	Totals	639	560

4. Economic Level. Because of the limitations of the research designs available, it was necessary to limit the number of variables treated in the analysis of variance design. Economic level was given only incidental consideration. It was felt that since intelligence correlates rather highly with economic level,[1] that the latter would have some control within the framework of the design, though it be of an indirect nature.

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[1] Florence Goodenough, The Measurement of Mental Growth in Childhood, (New York: Houghton Mifflin Co., 1947), p. 470.

5. Reading Achievement Level. The factor of the subjects' general reading ability was controlled by the test items of The Learning Methods Test. Since we were not primarily interested in reading comprehension or efficiency in oral reading skills per se, but in the specific factor of word recognition, the subjects' ability or inability to recognize words of a particular level was taken as the index of word recognition ability prior to teaching. The Learning methods Test allowed for achievement in word recognition ability anywhere between the primer and the third grade level. Any subject who missed less than forty words on a level was moved to the next higher level and again pre-tested. Any subject who did not miss at least forty words on one level was eliminated from the experiment.

6. School Grade Placement. This factor was artificially controlled by chronological age. That is to say, because of the philosophy of social promotion adhered to in the particular area from which the subjects were drawn, all seven year old subjects were in the second grades, eight year olds in the third grades, and nine year olds were drawn from the fourth grades. No subject was included in this experiment who had not had at least one year of public schooling. Chronological age, as pointed out above, was treated as a variable in the experiment; therefore, it was not believed to be essential to treat school grade placement level as a separate factor.

7. Race. This was controlled by using subjects of only the white race. It should be noted here that no subjects from bilingual homes were used in this experiment in an attempt to minimize experiences in language differences.

8. Vision and Hearing. These two physiological factors were controlled by excluding any subjects from the experiment who did not fall within the normal range of vision and hearing as measured by the Telebinocular and the Audiometer respectively.

9. Personality. An assumption was made with respect to the factor of personality. It was assumed that any subject capable of carrying out the test tasks was stable enough for the purposes of this research. Only one subject had to be excluded because of the severity of his emotional maladjustment.

10. Geographical Distribution of Subjects. This research was limited to the central Florida area. The subjects were drawn from five public schools in Pasco County, Florida. Most of the subjects' parents were engaged in the citrus industry, either working in the groves or in the processing and canning plant located in Dade City, Florida. No subjects were from the homes of professional parents, and there were only two from merchant-retail parentage. All subjects lived within a radius of thirty-five miles.

11. Teachers. Teacher variability was controlled by using only one examiner in administering The Learning Methods Test. This writer did all of the testing and teaching involved in this experiment. At this point, it might be well to point out that if any one of the methods appears to be superior in the teaching of the majority of the subjects, then we must certainly question to what extent teacher bias has caused this since only one teacher was used. If, however, no one method appears predominantly superior, then we will accept this as prima facie evidence

that there was no significant amount of teacher bias affecting the research.

12. Teaching Method. (The major independent variable). The teaching methods--visual, phonic, kinesthetic, and combination, were controlled through the standard procedures outlined in Chapter III and Appendix III.

13. Word Recognition. (The dependent variable). The number of items correctly recalled on The Learning Methods Test after a twenty-four hour period served as the subject's score for each teaching method.

Procedures

Each of the subjects was administered a word recognition pre-test using the words from The Learning Methods Test to determine the level of items to be used for each individual. After the forty items were selected by the procedures described in Chapter III, the writer administered the four standard teaching lessons as outlined in detail in Appendix II. Each subject was tested after a twenty-four hour period for recall of the ten words taught the preceding day for four consecutive days. The total number of correct responses on this delayed recall test was recorded as the subject's score for that particular method and became a part of the data for this study. Thus each subject had four final scores, one for each of the four methods, and each of which could range from zero to ten.

Preliminary Treatment of Data

For treatment purposes, the fifty-eight subjects were arranged into the three age and the three intelligence groups described above! Since each subject was taught by four methods, this resulted in a 3 x 3 x 4 design or a total of 36 treatment groups. There was a minimum number of five subjects per cell.

For each of the thirty-six cells and also for each chronological age group and each intelligence group, means and standard deviations of the scores obtained on The Learning Methods Test were computed. These are shown in Table 6.

Because of the extent of the variance about the means for some of the groups, a test for the homogeneity of variance[1] was run. The corrected chi-square with 35 degrees of freedom was 58.627 which is not significant at the one per cent level. Therefore, the hypothesis of random sampling from a population with a common variance is acceptable.

It was obvious from the data of Table 6 that the scores were skewed toward the upper end of the scale. In order to visualize the extent of this problem, a frequency distribution of scores was made for each age and intelligence group. These data are shown in Tables 7 and 8.

Because of the skewedness of scores observed in Tables 7 and 8, the conclusions and interpretations regarding the high intelligence and the nine year old groups will be sharply restricted.

Analysis of Variance

A 3 x 4 x 3 analysis of variance design[2] was used to determine whether the means of the thirty-six treatment groups differed significantly. Table 9 summarizes the data needed for this analysis.

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[1] Allen E. Edwards, Experimental Design in Psychological Research, op. cit., pp. 195-98.

[2] E. F. Lindquist, Design and Analysis of Experiments in Psychology and Education, (New York: Houghton Mifflin Co., 1953), pp. 220-39.

TABLE 6

MEANS AND STANDARD DEVIATIONS OF SCORES OBTAINED ON THE LEARNING METHODS TEST FOR ALL 58 SUBJECTS

	INTELLIGENCE							
	Low (65 - 80)		Average (85 - 100)		High (105 - 120)		TOTAL	
			SEVEN YEAR OLDS					N = 15
METHOD	M*	SD	M	SD	M	SD	M	SD
Visual	4.0	3.24	7.6	1.14	9.6	.55	7.1	3.03
Phonic	1.8	3.03	5.2	1.92	8.8	1.10	5.3	3.58
Kinest.	4.0	2.86	4.8	2.49	6.4	2.51	5.1	2.63
Combin.	3.2	2.77	7.8	1.79	8.6	1.14	6.5	3.09
	N = 5		N = 5		N = 5		6.0	3.14
			EIGHT YEAR OLDS					N = 16
METHOD	M	SD	M	SD	M	SD	M	SD
Visual	2.4	1.34	7.5	1.64	9.2	.84	6.4	3.16
Phonic	1.8	.45	7.2	1.94	9.0	1.22	6.1	3.33
Kinest.	6.0	.71	7.3	1.96	9.2	1.10	7.5	1.86
Combin.	3.8	.84	8.3	.81	9.6	.55	7.3	2.60
	N = 5		N = 6		N = 5		6.8	2.80
			NINE YEAR OLDS					N = 27
METHOD	M	SD	M	SD	M	SD	M	SD
Visual	6.0	2.78	8.1	1.57	9.2	1.60	7.6	2.34
Phonic	5.1	3.10	7.1	1.97	8.7	1.21	6.8	2.59
Kinest.	5.9	2.20	5.9	1.97	8.2	2.14	6.4	2.22
Combin.	6.0	3.04	7.4	1.38	9.0	2.04	7.3	2.38
	N = 9		N = 12		N = 6		7.0	2.40

			ALL SUBJECTS					N = 58
METHOD	M	SD	M	SD	M	SD	M	SD
Visual	4.5	2.93	7.8	1.47	9.3	1.08	7.2	2.77
Phonic	3.4	3.04	6.7	2.03	8.8	1.11	6.2	3.89
Kinest.	5.4	2.19	6.0	2.18	7.9	2.20	6.4	2.38
Combin.	4.7	2.77	7.7	1.36	9.1	1.39	7.1	2.61
TOTALS	4.5	2.80	7.1	1.92	8.8	1.57	6.7	2.74
	N = 19		N = 23		N = 16			

*Explanation of Symbols

M = MEAN

SD STANDARD DEVIATION (Computed by dividing the sum of squares by N - 1).[1]

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[1] McNemar, *op. cit.*, pp. 219-20.

TABLE 7

FREQUENCY DISTRIBUTION OF SCORES OBTAINED ON THE LEARNING METHODS TEST BY THE THREE AGE GROUPS

Score	7 Yrs.					8 Yrs.					9 Yrs.					Grand Total
	V*	P	K	C	T	V	P	K	C	T	V	P	K	C	T	
10	3	1	0	1	5	2	3	4	3	12	7	5	2	6	20	37
9	4	3	1	5	13	4	3	1	5	13	5	2	5	5	17	43
8	2	1	2	1	6	3	0	3	2	8	5	5	3	1	14	28
7	1	2	4	3	10	0	2	1	1	4	1	5	2	7	15	29
6	1	1	0	0	2	1	2	5	0	8	6	2	4	2	14	24
5	0	1	1	2	4	1	1	2	1	5	0	2	4	3	9	18
4	2	1	1	0	4	1	0	0	2	3	1	3	5	1	10	17
3	1	1	3	0	5	2	0	0	2	4	0	2	2	1	15	14
2	0	1	2	2	5	0	4	0	0	4	2	0	0	0	2	11
1	0	0	1	0	1	2	1	0	0	3	0	0	0	1	1	5
0	1	3	0	1	5	0	0	0	0	0	0	1	0	0	1	6
		N = 15					N = 16					N = 27				232

TABLE 8

FREQUENCY DISTRIBUTION OF SCORES OBTAINED ON THE LEARNING METHODS TEST BY THREE INTELLIGENCE GROUPS

Score	Low I. Q. (65 - 80)					Average I. Q. (85 - 100)					High I. Q. (105 - 120)					Grand Total
	V*	P	K	C	T	V	P	K	C	T	V	P	K	C	T	
10	0	1	1	1	3	3	3	1	1	8	9	5	4	8	26	37
9	3	0	0	2	5	5	2	4	8	19	5	6	3	5	19	43
8	2	1	1	0	4	7	3	2	3	15	1	2	5	1	9	28
7	0	3	4	2	9	2	3	1	8	14	0	3	2	1	6	29
6	2	0	5	1	8	5	5	4	1	15	1	0	0	0	1	24
5	0	0	2	3	5	1	4	5	2	12	0	0	0	1	1	18
4	4	2	2	3	11	0	2	3	0	5	0	0	1	0	1	17
3	3	2	2	3	10	0	1	3	0	4	0	0	0	0	0	14
2	2	5	1	2	10	0	0	0	0	0	0	0	1	0	1	11
1	2	1	1	1	5	0	0	0	0	0	0	0	0	0	0	5
0	1	4	0	1	6	0	0	0	0	0	0	0	0	0	0	6
		N = 19					N = 23					N = 16				232

*Explanation of Symbols: V = Visual Method; P = Phonic Method; K = Kinesthetic Method; C = Combination Method; T = Totals.

TABLE 9

VARIANCE TABLE FOR DATA ON WORD RECOGNITION SCORES

Sources of Variation	Degrees of Freedom		Sum of Squares	Var. Est.	Variance Ratio	F
C.A.***(3)	C.A. - 1	2	40.9	20.4	20.4/8.1 20.4/22.9	2.52 .89
Method (4)	M - 1	3	40.6	13.5	13.5/11.4 13.5/8.1	1.18 1.67
I.Q. (3)	I.Q. - 1	2	655.5	327.8	327.8/22.9 327.8/11.4	14.31* 28.75**
C.A. - Method	(CA-1)(M-1)	6	48.5	8.1	8.1/3.8	2.13*
C.A. - I.Q.	(CA-1) x (IQ-1)	4	91.6	22.9	22.9/3.8	6.03**
I.Q. - Method	(IQ-1) x (M-1)	6	68.5	11.4	11.4/3.8	3.00**
C.A.- Method -I.Q.	(CA-1)(M-1) x (IQ-1)	12	19.6	1.6	1.6/3.9	.41
Within cells (w)	N-(CA)(M)(IQ)	196	766.7	3.9		
Total	N-1	231	1731.9			

*Significant at the five per cent level.

**Significant at the one per cent level.

***Explanation of other symbols: I.Q. = intelligence levels; C.A. = age levels; M = method.

Most of the information in Table 9 is straightforward and requires no explanation. However, some discussion of the error term (denominator) in the variance ratio is in order. This is a measure of the uncontrolled variation between subjects treated alike, or that portion of the total variation which cannot be accounted for by the experimental conditions. The within-cells variance estimate is usually the appropriate error term against which to test the significance of all other variance estimates.[1] The triple interaction was tested against this within-cells variance estimate and was found to be insignificant.

In view of this insignificant triple interaction, a corrected estimate of error variance was computed by combining the sums of squares and the degrees of freedom for within cells and the triple interaction. "The advantage of using an estimate based on such a combined sum of squares is that it will be based on a larger df and therefore be more stable."[2]

When the simple interactions were tested against this corrected estimate of error variance, all were found to yield F's significant at the levels indicated in Table 9. In the present study we were concerned only with the interaction between chronological age and method of teaching and the interaction between intelligence and method of teaching and the effects of these two interactions on the number of words learned in a fifteen minute teaching session. The third interaction, between chronological age and intelligence, was not of primary interest and was not further analyzed in this study.

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[1] Edwards, Experimental Design in Psychological Research, op.cit., pp.216-17.

[2] McNemar, op. cit., p. 315.

When interactions are significant, some authorities hold that "no very useful interpretation may be made of the main effects ...."[1] Other authorities recommend that "if a simple interaction is significant, its variance should be used in testing the significance of the main effects for the two variables involved."[2] This latter course was the one followed in computing the F's for the main effects in the present study. As would be expected, intelligence proved to be the most significant factor in determining the number of words learned in a fifteen minute teaching session.

Testing Significance Between Means With t-Tests

After it was found that the over-all F's were significant for the intelligence-method interaction and the age-method interaction, the t-technique was used to test the significance of the difference between any two of the group means. The formula[3]

$$t = \frac{M_1 - M_2}{\sqrt{\frac{s^2}{N_2} + \frac{s^2}{N_2}}}$$

was employed and the corrected estimate of error variance, (3.8), was used as the best estimate of s^2 or variance for all cases. This estimate was based on all the available scores and consequently was more dependable than an estimate based on just the two groups being compared.[4] It had 208 degrees of freedom; hence, any *t* obtained could be interpreted by entering the normal probability table. With this information, it was known that a *t* of 1.96 was required for significance at the five per cent level and a *t* of 2.58 was required for significance at the one per cent level.

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[1] Lindquist, op. cit., pp. 256-57.

[2] McNemar, op. cit., pp. 315-16.

[3] Ibid., p. 245.

[4] Ibid., p. 246.

In Table 10 can be found the twelve means for the intelligence x method interaction. These are numbered from one to twelve as an aid in designating which means have been compared in Table 10a. Only those comparisons suggested by the experimental design have been made. In cases where the difference between means was so small that the *t* value would obviously be insignificant, no *t* was computed.

In the low intelligence group, two *t* values proved significant; in both instances the phonic method was the poorer of the two teaching methods being compared. The kinesthetic method for the low intelligence group proved significantly better than the phonic method at the one percent level of confidence, while the combination method proved better than the phonic at the five per cent level.

For the average intelligence group, the two significant *t* values were obtained when the kinesthetic method was used on the low end of the comparison. Both the visual and the combination were significantly better than the kinesthetic method at the one per cent level of confidence for the average intelligence group.

For the high intelligence group, only one *t* value proved significant; the visual method was better than the kinesthetic at the five per cent level of confidence.

For all methods, the trend was for the mean scores to increase as the intelligence increased. For the visual method, the average group made

TABLE 10

MEANS FOR THE INTELLIGENCE x METHOD INTERACTION

Method	Low n = 19	Intelligence Groups Average n = 23	High n = 16
Visual	(1) 4.5	(5) 7.8	(9) 9.3
Phonic	(2) 3.4	(6) 6.7	(10) 8.8
Kinesthetic	(3) 5.4	(7) 6.0	(11) 7.9
Combination	(4) 4.7	(8) 7.7	(12) 9.1
TOTALS	4.5	7.1	8.8

TABLE 10a

SUMMARY OF t VALUES COMPUTED

Means Compared	t	Means Compared	t	Means Compared	t
M3 - M2	3.17**	M6 - M7	1.23	M6 - M2	5.50**
M3 - M1	1.43	M5 - M6	1.93	M7 - M3	1.00
M4 - M2	2.06*	M9 - M11	2.03*	M8 - M4	5.00**
M1 - M2	1.75	M12- M11	1.74	M9 - M5	2.38*
M5 - M7	3.16**	M9 - M10	.72	M10 - M6	3.33**
M8 - M7	2.98**	M5 - M1	5.50**	M11 - M7	3.02**
				M12 - M8	2.22*

$(M_{average} - M_{low})$
$t = 4.33$**

$(M_{high} - M_{average})$
$t = 2.70$**

---

*t significant at the five per cent level of confidence.

**t significant at the one per cent level of confidence.

significantly better scores than the low group (l.o.c. - 1%), and the high group made significantly better scores than the average group (l.o.c. - 5%). The improvement made by each level using the phonic method was significant at the one per cent level of confidence. For the kinesthetic method, the improvement in mean score of the average group over the low group was not significant; however, the difference between the high and the average groups using this method was significant at the one per cent level. For the combination method, the improvement made by each level was significant—average over low at the one per cent level, and high over average at the five per cent level.

Table 11 contains the twelve means for age by method interaction. These are also numbered from one to twelve and the comparisons of means suggested by the experimental design have been made. The t values are reported in Table 11a.

TABLE 11

MEANS FOR AGE AND METHOD INTERACTION

	Age Groups		
Method	7 Yr. Olds n = 15	8 Yr. Olds n = 16	9 Yr. Olds n = 27
Visual	(1) 7.1	(5) 6.4	(9) 7.6
Phonic	(2) 5.3	(6) 6.1	(10) 6.8
Kinesthetic	(3) 5.1	(7) 7.5	(11) 6.4
Combination	(4) 6.5	(8) 7.3	(12) 7.3
TOTALS	6.0	6.8	7.0

TABLE 11a

SUMMARY OF t VALUES COMPUTED

Means Compared	t	Means Compared	t	Means Compared	t
M1 - M3	2.82**	M9 - M11	2.26*	M10 - M6	1.15
M1 - M2	2.54*	M9 - M10	1.51	M10 - M2	2.38*
M4 - M3	1.97*	M12 - M11	1.70	M7 - M3	3.43**
M4 - M2	1.69	M1 - M5	1.00	M7 - M11	1.72
M7 - M6	2.03*	M9 - M5	1.97	M11 - M3	2.13*
M7 - M5	1.59	M6 - M2	1.14	M12 - M4	1.27
M8 - M6	1.74				

($M_{\text{nine yr. olds}}$ — $M_{\text{seven yr. olds}}$)
t = 1.59

*t significant at five per cent level of confidence.
**t significant at one per cent level of confidence.

For seven year olds, the visual method proved best and the kinesthetic proved the poorest. Visual was significantly better than the kinesthetic (1% l.o.c.) and also significantly better than the phonic (5% l.o.c.). In addition to being significantly poorer than the visual method, the kinesthetic method also proved significantly poorer than the combination method (5% l.o.c.).

In the eight year old group, only one significant t value was obtained. The kinesthetic was better than the phonic at the five per cent level of confidence.

For nine year olds, again only one significant t value was obtained. The visual method was significantly better than the kinesthetic at the five per cent level of confidence.

With the age groups, there was no consistent trend for the mean scores to improve as the age increased. For example, seven year olds and also nine year olds made better scores using the visual method than did eight year olds; however, none of these differences were significant. With the phonic method, the scores did increase as the age levels increased but none of these increases between adjacent age groups were significant. The nine year olds did make significantly better scores using the phonic method than the seven year olds (5% l.o.c.). The kinesthetic method was most effective for eight year olds; they scored significantly higher than seven year olds (1% l.o.c.), and also significantly higher than nine year olds (5% l.o.c.). For the combination method, none of the age groups differed significantly.

From the foregoing tables of 10a and 11a, it would appear that certain teaching methods are significantly more suitable for particular age and intelligence levels. The implications of these findings will be discussed in greater detail in Chapter V.

Results of Statistical Procedures

When our hypotheses were re-examined in the light of the statistical findings, the following conclusions were reached.

1. Chronological age, intelligence, and method of teaching word recognition interact significantly in determining the number of words learned in a fifteen minute teaching session. No.

2. Chronological age and method of teaching word recognition interact significantly in determining the number of words learned in a fifteen minute teaching session. Yes.

3. Intelligence and method of teaching word recognition interact significantly in determining the number of words learned in a fifteen minute teaching session. Yes.

4. Chronological age is a significant variable in determining the number of words learned in a fifteen minute teaching session. No.

5. Intelligence is a significant variable in determining the number of words learned in a fifteen minute teaching session. Yes.

6. Teaching method is a significant variable in determining the number of words learned in a fifteen minute teaching session. No.

Chapter V further summarizes the results of this study and outlines the conclusions and implications of the findings.

CHAPTER V

CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

In an attempt to determine the teaching method or combination of methods most effective in teaching word recognition to various types of subjects, this study was made. The four teaching methods that were evaluated because of their present popularity included the visual, the phonic, the kinesthetic, and a combination of the three.

Conclusions and Implications

The study has shown conclusively that different children learn to recognize words more efficiently by different teaching methods and that no one method is best for all children. We can draw some conclusions about the effectiveness or ineffectiveness of specific teaching methods for certain types of children.

1. Children of low intelligence. The phonic method is least effective for this group of children. On the other hand, the kinesthetic method proves to be the best method in the greatest number of cases but it is not statistically better than the visual and combination methods.

2. Children of average intelligence. For the majority of children in this group, the kinesthetic method is the least effective of all the teaching methods studied. The phonic method shows no statistical significance in either direction. Combination and visual methods prove to be about equally good for this group of children.

3. Children of high intelligence. In this group, we are restricted in any conclusions we can draw about the relative effectiveness of methods because all subjects tended to learn words readily regardless of the teaching method used. This resulted in mean scores very close to the maximum scores possible on The Learning Methods Test, and limited the interpretations that can be made regarding the differences between the mean scores.

There was one significant difference; the visual method seems to be superior to the kinesthetic method in teaching this group of high intelligence children to recognize words.

4. Seven year olds. For seven year olds, the visual method appears best and the kinesthetic method appears the poorest. The other two methods seem to be neither consistently effective or ineffective in working with this group.

5. Eight year olds. For this group, the kinesthetic method seems best; it is significantly better than the phonic and somewhat better than the other two. This finding might have some possible relationship to the fact that eight year olds are usually just becoming proficient in writing and show a great deal of interest in related activities.

6. Nine year olds. For nine year olds, no one of the four methods is outstandingly effective or ineffective. The visual method does tend to be better than the kinesthetic method for this group.

In general, the higher the intelligence, the more readily children learn words. This finding is certainly in keeping with results to be expected from this type of study. However, there is no consistent relationship between age and a child's readiness to learn words for the three age groups studied. This finding has implications for present school practices where chronological age is all too often used as the major criterion in deciding when a child is ready to learn words.

Recommendations

From any study involving the dynamics of children, there are always variables neglected because of their infinite number and their complexity, and because of the limitations of the research designs available. Therefore, the need becomes obvious for studies to further validate present findings and to explore other variables of importance not adequately treated in past research. Out of the study reported here comes the need for the following types of research.

1. A research design wherein teacher variance is explored as a factor in the various teaching methods is greatly needed. In the study reported here, only one teacher was used; therefore, no estimate of teacher variance can be made. In other words, the following question must go unanswered for the present: Had another teacher administered The Learning Methods Test to these groups of children, would the same findings have resulted?

2. A research design is needed wherein various combinations of teaching methods are studied as to their combined effectiveness in teaching word recognition.

3. Because of present conflicts in techniques of teaching word recognition to first graders, the need is urgent for a study in which the six year olds are given treatment.

4. This study used an individualized approach to the teaching of word recognition. Research dealing with group-type instruction to determine the relative effectiveness of teaching methods in that seating seems indicated.

5. The need is evident for an objective study that uses a longer period of training time for each method--perhaps weeks or months--than the fifteen minute training period used in this study.

There are also recommendations evolving from this study of practical application to classroom teachers and remedial reading clinicians. These include the following.

1. Because different children learn to recognize words most efficiently by different teaching methods, the classroom teacher must be aware of these individual differences when she applies group instruction techniques. Our research indicates the need for the teacher to familiarize herself with all the various techniques and to be versatile in her use of these if she is to teach all the children.

2. In individual cases, wherein the child is not making expected growth in word recognition skills, our research indicates the need for a diagnostic study of the case to determine the most appropriate method for the particular individual.

In summary, it is believed that this study has far-reaching implications for all those interested in how children learn to recognize words. There is a need to get away from the concept of "a best method" for teaching all children and to concentrate instead on finding out which method is best for which children.

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APPENDICES

APPENDIX I

LEARNING METHODS TEST WORD LIST

Primer Level

box
water
bed
three
man
boy
four
one
ball
night

milk
hen
girl
picture
pig
window
door
rabbit
kitten

dog
cat
school
doll
father
mother
cake
children
chair

tail
two
thr
sun
toy
egg
dinner
store
party

apple
barn
bird
head
cow
bread
baby
table
farm

First Grade Level

eye
fish
grandmother
train
mouth
bowl
people
circus
ten

meat
penny
road
light
bee
feet
dress
five
breakfast

chicken
city
sky
frog
hat
glass
coat
vegetables
dish

bell
paint
grass
feather
boat
duck
leaves
shoe
nut

plant
pocket
garden
elephant
corn
rain
cap
clothes
candy

APPENDIX I—Continued

orange
clown
Christmas
farmer
goat
mouse
teeth
seed
wing
ring
ship
ear
hair
sheep
teacher
nest
face
monkey
grandfather
wagon
flower
worm
basket
bag
sand
room
fly
wood
car
house
lion
paper
cross
birthday
nose
woman
airplane
sign
snow
rooster
fire
animals
six
paw
butter
squirrel
pony
policeman
floor
park
arm
money
leg
field
gate
men
bear
turkey
fruit
robin
game
street
letter
cup
horse
puppy
nail
hand
river
hay
book
automobile
food
sled

Second Grade Level

toes
rope
pan
king
whistle
bush
cabbage
mountain
chimney
kitchen
pail
fairy
berries
deer
bedroom
path
lake
eight
rose
bridge
rake
pool
ice
coal
umbrella
bottle
sugar
potato
lettuce
brook
mail
milkman
leaf
horn
blanket

APPENDIX I--Continued

ribbon
hunter
crow
heart
tie
picnic
building
balloon
star
baker
pie
ladder
wheat
card
tent
bone

calf
carrot
seven
peanut
fence
fox
wolf
women
button
doctor
plate
cloud
swing
bow
stair
pipe

butterfly
pumpkin
roof
shadow
goose
turtle
rug
station
finger
stove
branch
tiger
suit
moon
jar
sea

cage
block
Indian
pot
clock
forest
engine
twelve
bus
radio
market
twenty
lady
bug
lamb

candle
wheel
lamp
nine
zoo
rock
bank
telephone
handkerchief
arrow
body
skate
log
band
knife

Third Grade Level

snake
bench
pen
eleven
attic
pillow

sandwich
cottage
cart
hawk
belt
railroad

gift
cord
island
fork
crown
pitcher

chief
bamboo
desk
cattle
ax
sack

fountain
shelf
furniture
tub
cradle
curtain

APPENDIX I--Continued

owl
rat
pencil
seal
highway
reindeer
barrel
chain
knee
hotel
lily
grocery
queen
kite
wigwam
needle
tongue
map
eagle
forty

trousers
ant
whale
plow
diamond
artist
buffalo
donkey
envelope
boot
apron
gun
circle
toad
tulip
sword
fifteen
napkin
mitten
jacket

motor
fiddle
snail
beast
cherry
camel
peach
banana
beaver
hammer
piano
towel
soa ?
nurse
onion
thread
fan
lantern
canal
bicycle

soldier
fireman
lip
cheese
clover
comb
broom
castle
loaf
package
cabin
fifty
drum
kettle
dollar
insect
blossom
giant
plum
camera

grain
elevator
sailor
sixteen
beach
brick
sweater
club
stocking
cowboy
church
witch
chest
key
pin
library
rianbow
newspaper
caterpillar
beetle

APPENDIX II

LEARNING METHODS TEST - RECORD FORM
Reading Laboratory and Clinic
University of Florida
Robert E. Mills

Child's Name: Jack Smith Date: April 2, 1955 Grade 3
Sex M Age 9-3 I.Q. 96 Name of Intelligence Test WISC
Grade Level of Word-Cards Used: Primer X 1st ___ 2nd ___ 3rd ___

SET I. Method Used Phonic SET II. Method Used Kinesthetic

	Immediate	Delayed		Immediate	Delayed
1. nose	+	+	1. dress	+	+
2. park	+	+	2. animals	+	+
3. glass	0	0	3. fish	+	+
4. hair	+	0	4. mouth	+	+
5. circus	0	0	5. people	0	+
6. candy	+	0	6. hay	+	+
7. book	+	+	7. bowl	+	0
8. letter	+	+	8. corn	+	+
9. basket	+	+	9. sled	+	+
10. arm	+	+	10. woman	+	+
TOTALS	8	6	TOTALS	9	9

APPENDIX II—Continued

SET III. Method Used Visual

	Immediate	Delayed
1. yard	+	+
2. river	0	+
3. string	0	0
4. wagon	+	0
5. face	+	+
6. cap	+	+
7. nest	0	0
8. butter	+	+
9. pony	0	0
10. city	0	0
TOTALS	5	5

SET IV. Method Used Combination

	Immediate	Delayed
1. street	+	+
2. train	+	+
3. robin	0	0
4. game	0	0
5. car	+	0
6. meat	+	0
7. plant	+	+
8. lion	+	+
9. horse	0	0
10. room	0	0
TOTALS	6	4

COMMENTS: ____________________

Teacher: R. E. Mills   Institution: Univ. Clinic

APPENDIX III

SPECIFIC TEACHING PROCEDURES

Visual Method

Using ten "unknown" words from the controlled list provided, teach the child recognition of these words stressing exclusively the visual appearance and other visual clues of the words through the use of the following procedures for 15 minutes:

1. Present the ten picture-word cards to the child with picture-side up. Ask him to look at the picture, then at the word, and to say what it is. Do this with all ten of the cards.

2. Present the cards a second time with picture-side up. This time show the picture and the word and have the child make a sentence using the word.

3. Play at game of solitaire with the child. Do this by placing all ten of the cards with word-side up before the child. As he says each one of them, ask him to turn the card over to check his accuracy with the picture.

4. Ask the child to arrange the words in a meaningful sequence to form a sensible phrase or sentence. In some instances he will be able to use three or four of the words in a single sentence. He may add any other necessary words to make a complete sentence.

5. Discuss the relative length of the various words. Print the words on the blackboard or on paper, and then ask the child the following questions: Which is the longest word? Which is the shortest? Have him match words which are of the same length. Ask him to arrange the words in groups by stacking all the three letter word cards in one stack, the four in another stack, etc.

6. Draw on the board (or paper) a figure, the outlines of which follow the shape or gestalt of each one of the words. For example, a box or figure depicting the word farm would be tall at the beginning following the height of the letter f and then would take a long, low, rectangular form for the remainder of the word. After all ten shapes have been drawn, ask the child to match these various shapes with the words for which they stand.

7. Repeat activity "1" as described above.

APPENDIX III--Continued

8. If after activity "7", fifteen minutes have not elapsed since the lesson began, continue repeating the steps in order until exactly fifteen minutes have been spent on the lesson.

9. At the end of the fifteen minutes, administer the immediate recall test. Do this by exposing the word-side of the card to the child. If he responds correctly within the five seconds of exposure of the word, record the right response by placing + on the test record form by that word in the "Immediate" column in the space provided. Do this for all ten words. Record the total number of correct responses.

Phonic or Auditory Method

Using ten new "unknown" words from the controlled list provided, teach the child recognition of these words, stressing exclusively the sound qualities of the words through the use of the following teaching procedures:

1. Print the words on the blackboard (or paper), then say the word slowly with the child repeating the word after you. Ask the child to make a sentence with the word to insure that he understands the meaning. Then point to the opening letter of the first word. Say, "This is the letter so and so. It makes sound such as ____. The next letter is the letter so and so; it makes the sound of _____, etc. Have the child repeat the separate sounds after you as you do them with each word. Then have the child try the entire word sound by sound, then blending the different sounds into one whole until it is a unified, complete word. Do as much of this as possible in the first four or five minutes of this lesson.

2. Ask the child to think of other words beginning with the same sound as the first sound of _________ or words ending with the same sounds, or words having the same middle sound as the one being studied. Have the child arrange the cards (never present the picture-side of the cards during this phonic lesson) in different groups as he identifies and classifies the ten words as to common beginnings or endings.

3. Help the child to think of words that rhyme with the word you are trying to teach him.

4. Have the child identify familiar sounds or little-words-in-big-words of those being studied.

APPENDIX III--Continued

5. Repeat all ten words for the child with exaggerated sound stresses, with short pauses between the sound elements. Ask the child to listen closely to the sounds as you point to the particular part of the word being sounded. Then ask the child to say the word.

6. Ask the child to say the words now without your help. Have him listen closely to the sounds as you point to the letters as he slowly pronounces the words. (Do help the child with those words in which he still lacks recognition).

7. If fifteen minutes have not elapsed since the lesson began, continue repeating the steps in the order listed above until exactly fifteen minutes have been spent on this lesson.

8. At the end of the fifteen minutes, administer the immediate recall test for these ten words.

Kinesthetic Method

Using ten words from the "unknown" controlled list provided, teach the child recognition of these words by the kinesthetic or tracing method.

1. Present the child with the ten words written on the blackboard (or paper; if you use paper, use crayon or very soft lead pencil in a large size manuscript - printing, with the letters approximately two inches high). Have the child trace over the first word with his finger using perhaps only one finger to point to the letter and tract it, saying the word part by part as he traces it. The word should always be traced with the finger in contact with the paper. Then do all of the following steps with the first word presented before introducing a second word.

2. Have the child repeat the tracing several times. As he traces the word, he will be saying it. (Do NOT ask him the sounds of the letter or call attention to any of the sounds; also, do not allow the child to turn up the picture-side of the word car.)

3. After severak trials at tracing and saying, have the child write out the word, saying it while he writes. He should carry out this part of the lesson without looking at the copy. Do not permit erasures while attempting to reproduce the word. If the child attempts to erase, ask him to retract the word with his finger and then to rewrite it.

4. Repeat the tracing and writing until the child is able to reproduce the word in his own handwriting at least once. Then present the regular "test size word card" with the smaller print and ask him to identify it.

APPENDIX III--Continued

5. Carry through steps "1" through "4" with all ten of the words.

6. Repeat procedure "1" hurriedly with all ten of the words.

7. If fifteen minutes have not elapsed since the lesson began, continue repeating the steps in the order listed above working with those words with which the child is experiencing difficulty, until exactly fifteen minutes have been spent of this lesson.

8. At the end of the fifteen minutes, administer the immediate recall test.

Combination Method

The other methods (visual, auditory, and kinesthetic) are now combined into an eclectic method for our fourth procedure. Using a new set of ten "unknown" words, word recognition will be taught by giving equal stress to the visual, auditory, and kinesthetic approaches.

1. Present the ten picture-word cards to the child with picture-side up. Ask him to look at the picture, then at the word, and to say what it is. Do this with all ten of the cards. Have the child say the word several times while looking at the picture.

2. Present the initial sounds of the letters as you point to them. Also stress ending sounds. Ask the child to find words that rhyme with those listed, or words that begin or end like those listed. Ask the child to find any common phonograms or little-words-in-big-words. Repeat the ten words slowly as you stress the sounds as you point to them. Have the child repeat them after you.

3. Write the ten words on the blackboard or paper. Have the child trace over the words with his finger (the finger should always be in contact with the board or paper) saying the word part by part as he traces it.

4. While looking at the picture of the word (cover over the word) ask him to write the word. After he has written the word correctly, ask him to sound it out. Help him to stress the initial and ending sounds.

5. If fifteen minutes have not elapsed since the lesson began, repeat step "4" until exactly fifteen minutes have been spent on this lesson.

6. At the end of exactly fifteen minutes, administer the immediate recall test.

APPENDIX IV

RAW SCORES AND DESCRIPTION OF SUBJECTS ADMINISTERED LEARNING METHODS TEST

First Administration

Subject	C. A.	WISC	RAW SCORES: Delayed Recall			
		Total I. Q.	Visual	Phonic	Kinesthetic	Combination
1.	12-4	68	1	5	6	4
2.	11-1	67	8	6	4	10
3.	10-3	94	8	8	9	10
4.	10-10	88	5	10	5	4
5.	10-2	87	9	9	10	9
6.	10-3	86	5	6	4	9
7.	10-8	83	6	5	6	8
8.	10-2	76	7	9	8	7
9.	10-4	70	6	7	5	6
10.	10-1	70	10	5	8	9
11.*	9-0	115	10	10	9	10
12.*	9-11	112	10	8	9	9
13.*	9-6	112	10	9	8	10
14.*	9-1	111	9	10	10	10
15.*	9-0	111	10	7	9	10
16.*	9-0	100	8	10	5	6
17.*	9-3	96	7	8	6	7
18.*	9-0	96	10	9	9	7
19.*	9-5	95	8	10	7	9
20.*	9-10	94	9	4	5	8
21.*	9-7	92	8	7	4	7
22.*	9-8	91	6	7	9	10
23.*	9-0	91	6	8	4	5
24.*	9-3	90	10	6	3	9
25.*	9-7	88	9	6	5	7
26.*	9-3	88	10	5	6	7
27.*	9-11	85	6	5	8	7
28.	9-10	83	7	6	5	3
29.*	9-11	79	9	10	7	9
30.*	9-2	78	6	4	8	5

APPENDIX IV—Continued

31.*	9-4	75	8	7	4	10
32.*	9-10	73	6	3	10	6
33.*	9-11	71	9	7	5	7
34.*	9-5	71	8	8	4	9
35.*	9-2	71	2	0	3	1
36.*	9-7	70	2	4	6	4
37.*	9-5	65	4	3	6	3
38.	9-5	64	6	7	4	5
39.	8-5	128	10	8	8	10
40.*	8-7	114	10	9	8	10
41.*	8-9	112	9	10	10	10
42.*	8-11	111	8	9	10	9
43.*	8-10	109	9	10	10	10
44.*	8-4	108	10	7	8	9
45.*	8-1	99	6	6	10	7
46.*	8-6	98	8	10	5	9
47.*	8-1	96	8	9	9	9
48.*	8-9	92	9	5	6	8
49.*	8-10	91	5	6	6	9
50.*	8-3	90	9	7	8	8
51.*	8-1	77	1	2	6	3
52.*	8-2	75	3	2	5	4
53.*	8-5	71	3	2	7	4
54.*	8-4	70	1	1	6	3
55.*	8-11	68	4	2	6	5
56.*	7-6	115	10	9	7	9
57.*	7-7	114	9	9	2	7
58.*	7-3	114	10	7	8	8
59.*	7-3	109	9	10	8	9
60.*	7-10	105	10	9	7	10
61.	7-11	104	9	9	8	9
62.	7-11	101	9	8	10	8
63.	7-4	101	9	7	7	10
64.*	7-6	99	8	6	4	9
65.*	7-10	95	8	3	3	7

APPENDIX IV—Continued

66.*	7-8	93	7	8	3	9
67.*	7-10	88	6	5	9	9
68.*	7-10	88	9	4	5	5
69.	7-8	82	9	8	6	8
70.	7-2	81	7	7	7	8
71.*	7-4	79	3	2	7	5
72.*	7-11	77	4	0	3	2
73.*	7-5	68	9	7	7	7
74.*	7-10	67	4	0	2	2
75.*	7-5	65	0	0	1	0

*Denotes subjects used in analysis of co-variance design in Chapter IV.

APPENDIX IV--Continued

Raw Scores of Subjects Re-administered Learning Methods Test: Second Administration

Note: The following thirty subjects are included in the list of subjects above. They were re-administered The Learning Methods Test a second time for purposes of the reliability study reported in Chapter III. The "Subject" numbers in this table refer to the corresponding "Subject" numbers in the above table as they represent the same individual. The "Raw Scores" of the various methods reported below are the results of the "Delayed Recall" test in the second administration.

Subject	Visual	Phonic	Kinesthetic	Combination
17.	8	8	6	7
20.	7	4	5	7
21.	8	6	4	7
27.	6	7	7	8
30.	5	3	7	5
31.	7	6	5	8
35.	2	1	3	2
37.	4	2	7	3
38.	6	7	3	5
44.	10	7	7	10
46.	8	9	6	9
47.	8	9	7	9
48.	8	5	6	8
50.	9	7	7	7
51.	1	0	6	3
52.	3	3	5	4
54.	2	2	4	5
55.	4	3	5	4
56.	9	9	8	9
57.	8	9	3	7
58.	10	7	9	8
59.	9	10	7	10
60.	8	8	7	9
61.	8	8	9	10
62.	9	8	9	8
63.	9	8	7	10
65.	8	4	3	7
66.	7	8	4	8
69.	9	8	5	7
71.	3	2	6	4

BIOGRAPHICAL SKETCH

Robert Edward Mills was born in Richfield, North Carolina, September 15, 1926. He graduated from Richfield High School in 1943 and entered the University of Miami, Coral Gables, Florida, the same year.

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He entered the United States Naval Reserve in February, 1944, where he served for two years in the capacity of classification and public relations officer in California and Saipan respectively.

Mr. Mills returned to the University of Miami and completed his Bachelor of Education degree in 1949.

He accepted an appointment at Admiral Farragut Military Academy, St. Petersburg, Florida, in 1949, where he taught English and served as Counselor and Remedial Reading Consultant.

In 1950, Mr. Mills took a position as Director of the Reading Clinic and Child Development Division of Psychological Counseling, Inc. (now known as Byron Harless and Associates, Inc.), Tampa, Florida. He continued in this position for three years at which time he resigned to continue his formal training.

The writer attended Florida State University, Tallahassee, Florida, where he was a research assistant in the psychology department. He completed his work for the Master of Science degree with a major in psychology from that institution in August, 1954.

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Mr. Mills then entered the University of Florida, Gainesville, where he served as a graduate assistant in the Florida Center of Clinical Services in the Reading Laboratory and Clinic Division for one year.

He accepted a position as psychological evaluator for the Pasco County Public School System, Dade City, Florida, in August, 1954. In this capacity, he served as consultant to the eighteen schools in the county. Mr. Mills resigned this position in June, 1955.

Mr. Mills is now Director of the Mills Educational and Testing Center, Ft. Lauderdale, Florida.

He is a member of Kiwanis International, Kappa Delta Pi, International Council for Exceptional Children, and Florida Psychological Association.

Mr. Mills is married to the former Barbara Ann Lupfer of Kissimmee, Florida.

This dissertation was prepared under the direction of the chairman of the candidate's supervisory committee and has been approved by all members of the committee. It was submitted to the Dean of the College of Education and to the Graduate Council and was approved as partial fulfillment of the requirements for the degree of Doctor of Education.

August 13, 1955.

J. B. White
Dean, College of Education

Dean, Graduate School

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